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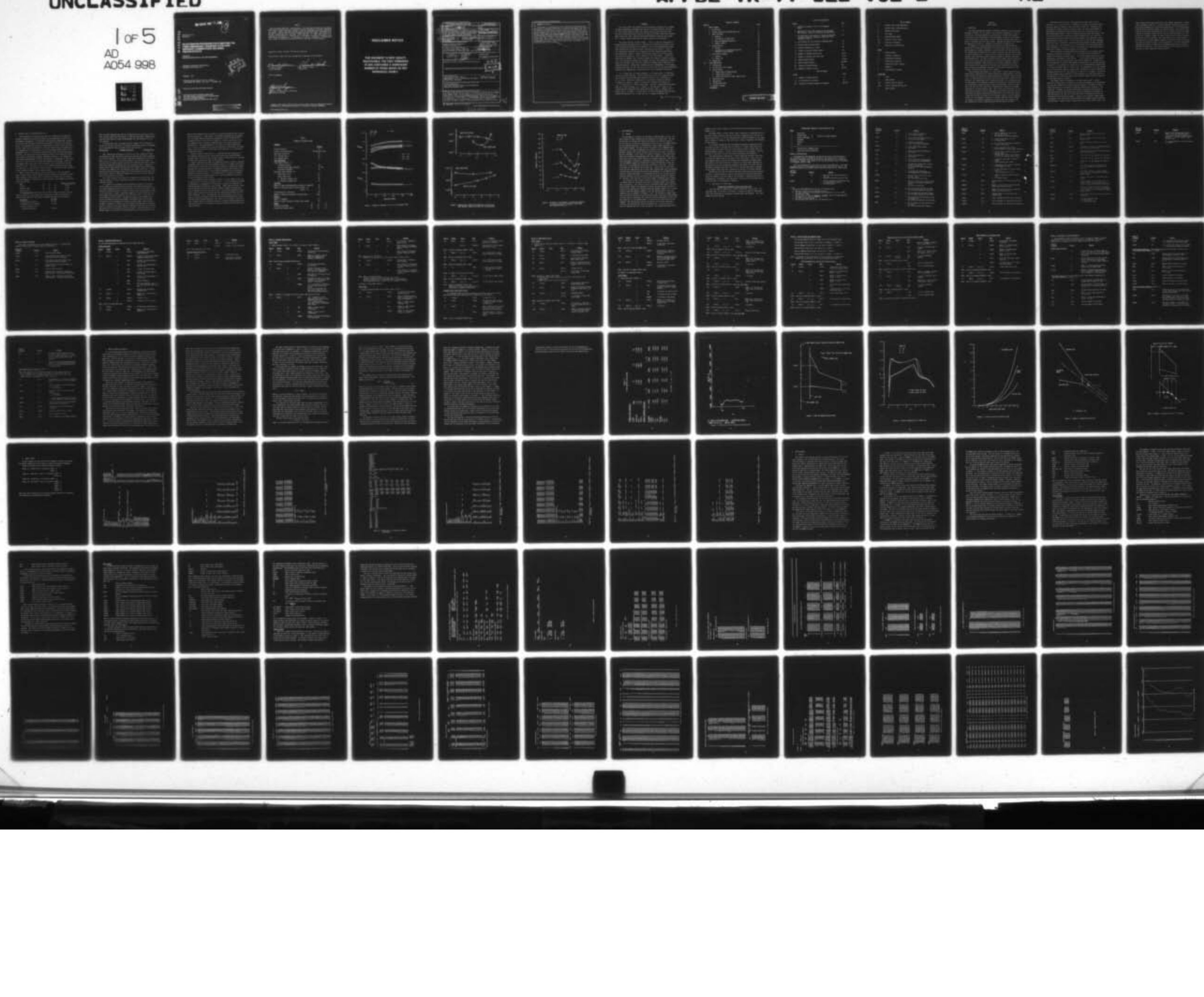

FOR FURTHER TRAN

AFFDL-TR-77-122
VOLUME II

AN AUTOMATED PROCEDURE FOR COMPUTING THE THREE DIMENSIONAL TRANSONIC FLOW OVER WING-BODY COMBINATIONS, INCLUDING VISCOUS EFFECTS

VOLUME II
PROGRAM USER'S MANUAL AND CODE DESCRIPTION

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GRUMMAN AEROSPACE CORPORATION
BETHPAGE, NEW YORK 11714

FEBRUARY 1977

TECHNICAL REPORT AFFDL-TR-77-122, VOLUME II
FINAL REPORT FOR PERIOD 1 MAY 1975 - 1 OCTOBER 1977

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AIR FORCE FLIGHT DYNAMICS LABORATORY
AIR FORCE WRIGHT AERONAUTICAL LABORATORIES
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This technical report has been reviewed and is approved for publication.

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This volume provides the detailed information required to use the program described in Volume I of this report. This includes a description of the input data set and the output results, and typical JCL for IBM and CDC operation. A description of the differences in the code between IBM and CDC is presented in the second part of this volume. We also include a complete sample case is included in order to illustrate the use of the program. The full details of the method are described in Volume I, however, a brief description of the method is provided. → next page

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20. ABSTRACT (Continued)

The program is a numerical method that predicts the detailed pressure distribution on wing-body combinations at transonic Mach numbers less than one and integrates the pressures to obtain aircraft force and moment data. The code has been developed with the intent of providing the user with an easy to use and reliable tool. The basic inviscid prediction method is the modified transonic small disturbance theory program developed by Ballhaus, Bailey and Frick. In order to provide accurate surface pressure predictions on the wing, several additional features of the typical transonic flowfield have been incorporated. These consist of the viscous displacement effect, local strong viscous interaction at the shock wave foot and at the trailing edge (including an approximate treatment of local shallow separations), and finally, the interaction effect of the fuselage.

FOREWORD

This final report was prepared by the Aerodynamics Section of the Grumman Aerospace Corporation, Bethpage, New York for the Flight Mechanics Division, Air Force Flight Dynamics Laboratory, Wright-Patterson Air Force Base, Ohio. The work was performed under Contract No. F33615-75-C-3073, which was initiated under Project No. 1476, "Advanced Wing-Body Aerodynamic Analysis and Design." Mr. J. Kenneth Johnson (FXM) was the Project Monitor of this contract.

The report consists of three volumes. Volume I, entitled "Description of Analysis Methods and Applications," describes the methods used to predict surface pressure distributions and aerodynamic forces on three-dimensional wing-body combinations at transonic speeds, including viscous effects. Volume I also contains an extensive set of comparisons between numerical predictions and experimental results. Detailed instructions required to use the program are provided in Volume II, "User's Manual and Code Description." Volume III was written at Sybucon, Inc., Atlanta, Georgia and contains a complete description of the theory and program that computes the full three-dimensional boundary layer over the wing. This work was performed by Sybucon under subcontract to Grumman Aerospace. Although this program operates independently of the program described in Volume II, the input data set required for the full three-dimensional boundary layer computation is generated by the code documented in Volume II.

Mr. F. Berger was the Program Manager; Dr. W. Mason and Mr. D. MacKenzie served as Project Engineers. The work was performed in close cooperation with the co-authors from the NASA Ames Research Center, Dr. W. F. Ballhaus and Ms. J. Frick. Additional contributors to the project included G. Simpers, A. Vachris, D. Raila, P. Aidala, M. Sturm and A. Bunnell of Grumman, and Drs. F. R. Bailey and T. Holst of NASA Ames. Moreover, contributions have been made by A. Chen of Boeing, Drs. R. Melnik, B. Grossman and G. Volpe of the Grumman Research Department and Grumman Consultants Prof. A. Jameson, Prof. J. Werner and Dr. E. Murman. As noted above, the three-dimensional boundary layer program was written by Dr. J. Nash and Dr. R. Scruggs of Sybucon, Inc.

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LIST OF SYMBOLS

a	Constant used in mesh generation
b	Constant used in mesh generation
Cp	Pressure coefficient
L	Grid index
M_∞	Freestream Mach number
X/C	Fraction of local chord
Y/S	Fraction of wing span
Z	Mesh point in vertical grid

<u>Greek</u>

α	Angle-of-attack
Δ	Increment to quantity
δ^*	Displacement thickness
ϵ	Correction to potential
η	General grid point location
Σ	Summation
ξ	Transformation variable

<u>Subscripts</u>

i	Index
L	Lower surface
max	Maximum value of quantity
root	Value of variable at wing root
u	Upper surface

SECTION I

USER'S MANUAL

1. INTRODUCTION

This volume provides the detailed information required to use the program described in Volume I of this report. This includes a description of the input data set, the output results, and typical JCL for IBM and CDC operation. A description of the differences in the code between IBM and CDC is presented in the second part of this volume. We also include a complete sample case in order to illustrate the use of the program. Although the details of the method are described in Volume I, a summary of the method is included below.

The program is a numerical method that predicts the detailed pressure distribution on wing-body combinations at transonic Mach numbers less than one and integrates the surface pressures to obtain aircraft force and moment data. The code has been developed with the intent of providing the user with an easy to use and reliable tool. The basic inviscid prediction method is the modified transonic small disturbance theory program developed by Ballhaus, Bailey and Frick (Reference 1). In order to provide accurate surface pressure predictions on the wing, several additional features of the typical transonic flowfield have been incorporated. These consist of the viscous displacement effect, local strong viscous interaction at the shock wave foot and at the trailing edge (including an approximate treatment of local shallow separations), and finally, the interaction effect of the fuselage.

The program has been applied to a large number of cases for which experimental data is available and to several examples of extreme geometric configurations for which the method will operate successfully, although no data is available. The experience gained during the effort has been used to reduce the complexity of the program input to its simplest practical form, allowing the user to concentrate on the aerodynamic aspects of the analysis. The program should not be expected to produce results if there are significant regions of separated flow, and this fact can be used to determine the limits of the program applicability for any particular case. Body effects are incorporated into the program by providing an infinite rectangular cross-section upon which the fuselage slopes are applied, after suitable modification via slender body theory to take into account the transfer of the boundary condition from the fuselage surface to the rectangular cross-section boundary condition support surface. In addition, the program is assembled in a modular form that allows for an easy upgrading as various improved analysis methods become available.

Three-dimensional transonic flow calculation methods were initially developed by F. R. Bailey and W. F. Ballhaus at the NASA Ames Research Center, using the classical transonic small disturbance equations. Experience with the classical transonic small disturbance theory for wings with moderate to large sweep indicated that some refinement had to be incorporated into the small disturbance theory in order to properly simulate swept shock waves. The first modifications were proposed by Lomax (Reference 2), et al. and it is this particular equation which has been implemented in the baseline inviscid code described in this volume. This inviscid code is also the only available method which can, at present, simulate relatively general fuselage configurations routinely. The code makes use of the embedded grid scheme developed by Boppe (Reference 3) in order to reduce the execution time and storage requirements, while retaining maximum accuracy on the surface.

Viscous effects are investigated and accounted for in the present method through two different approaches. The full viscous-inviscid iteration is carried out assuming a boundary layer of the infinite swept wing type at each span station, augmented by local treatments of the strong interaction regions at the shock foot and trailing edge, and shallow separations. In addition to this calculation, an entirely new program has been written by Nash and Scruggs (Volume III of this report) to compute the fully three-dimensional laminar and/or turbulent boundary layer on finite wings. This program is not fully coupled with the inviscid calculation, however, the inviscid/strip viscous program will automatically produce the input data set for the 3-D B.L. program. The resulting 3-D boundary layer prediction is then tabulated in a form that allows for the generation of a data deck that could be used to make a fully 3-D correction to the actual airfoil ordinates.

The present method is described in a three volume report. Volume I describes the theoretical foundation of the various elements of the method and how they are combined into a single computer program. No attempt is made to repeat the excellent and detailed theoretical descriptions contained in the references. Instead, the volume concentrates on providing the user with a practical overview of the methods and a working knowledge of the aspects of the methods which the user can control and which are sometimes difficult to discover from the theoretical papers. Volume I also contains a large number of examples of the application of the program to a complete range of aircraft configurations. These include correlations on the F-8 and TACT aircraft. The

volume concludes with some observations on the general integration of computational aerodynamic tools into a uniform system with common input and output sets, and an examination of the potential applications to the design problem using the present analysis program as a baseline method. The present volume contains the detailed instructions required for program operation, including a review of the output results and the associated notation/definition. This section also contains a sample case which should provide a complete illustration of the use of the program. The second part of this volume contains a description of the actual computer program in sufficient detail so that a user can learn the code well enough to make modifications. The three-dimensional boundary layer method is treated as an independent program and is entirely described in Volume III. That volume contains both the theoretical description and the user's manual and code description.

2. PROGRAM LIMITS AND COMPUTATIONAL COST

The requirement for handling most cases of interest without demanding excessive storage and running time leads to some compromises in the size of the dimension statements. As delivered, the program is dimensioned to handle the typical body and airfoil definition required for transonic flow calculations. The computational meshes are dimensioned to the size found sufficient for most cases, with the exception of the inner X-mesh which is dimensioned to 90 streamwise points, although most of the calculations employ from 60 to 70 streamwise points. All other grid dimensions are fully utilized during each execution. The additional X-mesh dimensions allow for the occasional calculation of special cases with increased streamwise resolution. The resulting code requires approximately 1400K of core storage on IBM systems or 160K octal small core, 744K octal Level 2 large core memory on CDC systems. This size is probably close to an upper limit for making routine calculations at most computer centers. Reducing the size of the program substantially would lead to a reduction in the accuracy of the calculation. The present code represents a good compromise between code size and accuracy.

Table I presents the various limits that are built into the program. Most of these limits could be changed by simply adjusting the dimension statements, however, almost three years of experience indicates that the present limits are adequate. Typical mesh sizes produced by the automated grids generation routines are:

Mesh	X	Y	Z	Total No. of Points
Initial	40	20	20	16,000
Exterior Crude	30	18	20	10,800
Interior Fine	59	30	20	35,400

Our experience with this code on a CDC 7600 computer indicates that the various portions of the solution can be expected to take the following CPU times (on the 7600) with the meshes internally generated by the program.

Calculation	CPU Time
1 initial grid iteration	0.71 sec
1 coarse/fine grid iteration	1.72 sec
1 viscous iteration at a single span station	3.80 sec

Thus, the total computational time can be approximated by multiplying the CPU time for each step by the total number of iterations performed. Summing these values for each step will yield the approximate CPU time required on a CDC 7600 computer.

In running this code on the Ames CDC 7600, Grumman IBM 370/168 and ASD IBM 370/155, we have found that the following relationship holds for the amount of CPU time required (taking the Ames 7600 as the baseline):

Ames CDC 7600	Grumman IBM 370/168	ASD IBM 370/155
1	5	30

Thus, computations performed on an IBM 370/155 can be expected to take approximately 30 times as much CPU time as the identical calculation performed on a CDC 7600 computer. The CPU times listed above, together with the factors shown above, can be used to provide an estimate of the CPU time required to run this code on a machine similar to any of the three machines listed. Approximate time required for different size grid calculations can be computed by determining the time required per mesh point per iteration, which then serves as a basis for computing the time required for arbitrary grid sizes. A typical inviscid solution would require about 100 initial mesh and 400 fine/crude iteration pairs in order to obtain a converged solution, with a typical computing time of 750 seconds on a CDC 7600.

The viscous solution can be expected to take about one and a half to two times the number of inviscid iterations, with four or five boundary layer calculations required.

In contrast to the standard linear aerodynamics programs for which the running times can be predicted quite accurately, the present method employs non-linear techniques for which the running time is difficult to predict. The numerical procedure requires an iterative solution which converges quite slowly to the final value. Figure 1 provides an example of the way in which the surface pressure distributions approach the final value, which is taken here to be the value at 400 iterations. Although the figure is representative, the actual convergence rate will vary between configurations and, for the same configuration, the convergence will change with Mach number, angle-of-attack and mesh. Typically, a solution can be considered converged when the lift and number of supersonic points are remaining relatively constant at each iteration. The maximum error and residual should also be small. The maximum error is the maximum change of the potential between iterations, while the residual is the

value of the summation of all the terms in the governing equation (which should be identically zero). Traditionally, the program terminates when the maximum error is smaller than the prescribed convergence criterion (normally 10^{-5}). The maximum residual should also be inspected in order to verify that it has been reduced by about 3 orders of magnitude from its original value during the iteration. Some experimentation on the part of the user should verify that a "typical" converged solution can be obtained by running about 100 iterations on an initial mesh and another 300 or 400 iterations on the fine/crude embedded mesh system.

Figure 2 shows the maximum error, ϵ, obtained after 220 iterations for two different configurations at various Mach numbers and angles-of-attack. The main result that can be seen in these figures is that each case is slightly different and no consistent trend can be observed.

Figure 3 shows how the number of iterations required to obtain a specified convergence level varies with the relaxation factor ω. To repeat, the specific results shown on this figure will vary with configuration, Mach number, angle-of-attack and the particular mesh. Nevertheless, we show this result to indicate that the default values of the relaxation parameters are not necessarily optimum for a particular case. If an extreme amount of running at a design point is planned, some experimentation with ω may be worthwhile, along with the use of a baseline saved solution.

The convergence history presented in Figure 1 is very similar to the convergence history of a slowly converging series. It is very tempting to attempt to accelerate the convergence of the solution by applying the large body of mathematical analysis devoted to that problem. Indeed, Hafez and Cheng (Reference 4) have done this with some success, however, attempts to employ this type of strategy during the solution process in the present program has led to uneven results, where the technique has only occasionally improved the convergence properties. Due to the additional size and complexity of the code required to include this option, along with the generally disappointing results obtained during the experimentation, this option is not included in the final code. However, should a reliable acceleration technique become available, the code can be modified to incorporate this type of capability without any particular difficulty.

TABLE I

SUMMARY OF PROGRAM LIMITS

GEOMETRY	Maximum		
Airfoil Sections	11		
Airfoil Ordinates/Section	90 upper/90 lower		
Wing Twist Locations	11		
L.E. Planform Pairs	10		
T.E. Planform Pairs	10		
BODY DEFINITION			
Slope Input (IBODIN = F)			
Streamwise Slopes	90		
Top and Bottom Span Locations	10 each		
Side Wall Locations	20		
Body Line Input (IBODIN = T)			
Upper Center Line	90		
Lower Center Line	90		
Y - Max-Half Breadth Line	90		
Z - Max-Half Breadth Line	90		
SOLUTION			
Number of span stations at which solution is computed	29		
Number of inviscid points on chord (IVISC = F)	60		
(IVISC = T)	50		
Viscous/Inviscid Iterations	20		
Number of Inviscid fine/crude iteration pairs	1000		
MAPPING			
Number of segments	12		
Number of points allowed to define each segment	10		
MESHES	X	Y	Z
Exterior Crude Mesh	30	20	20
Initial and Interior Mesh	90	30	20

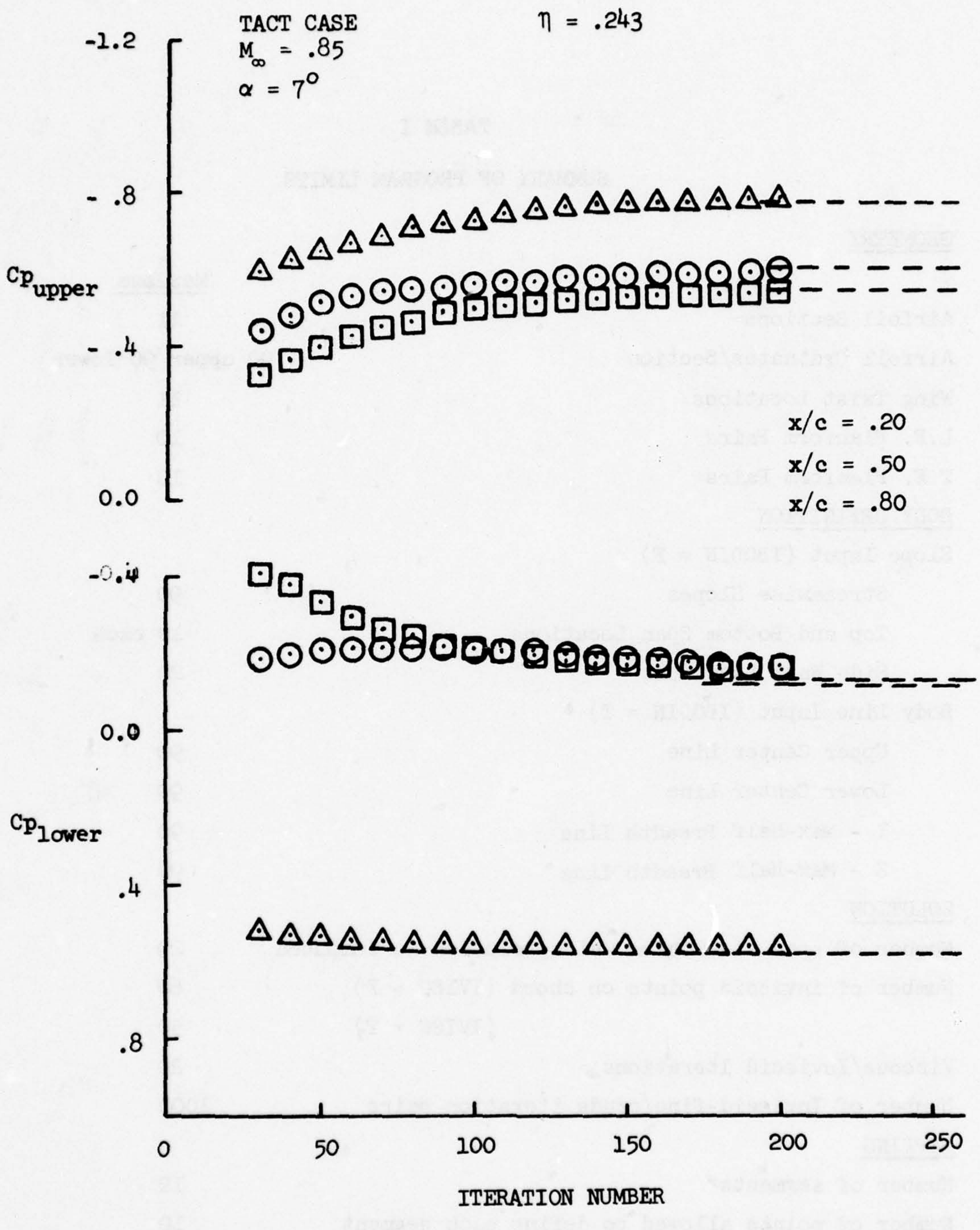


Figure 1 Asymptotic Approach of Cp to Its Converged Value

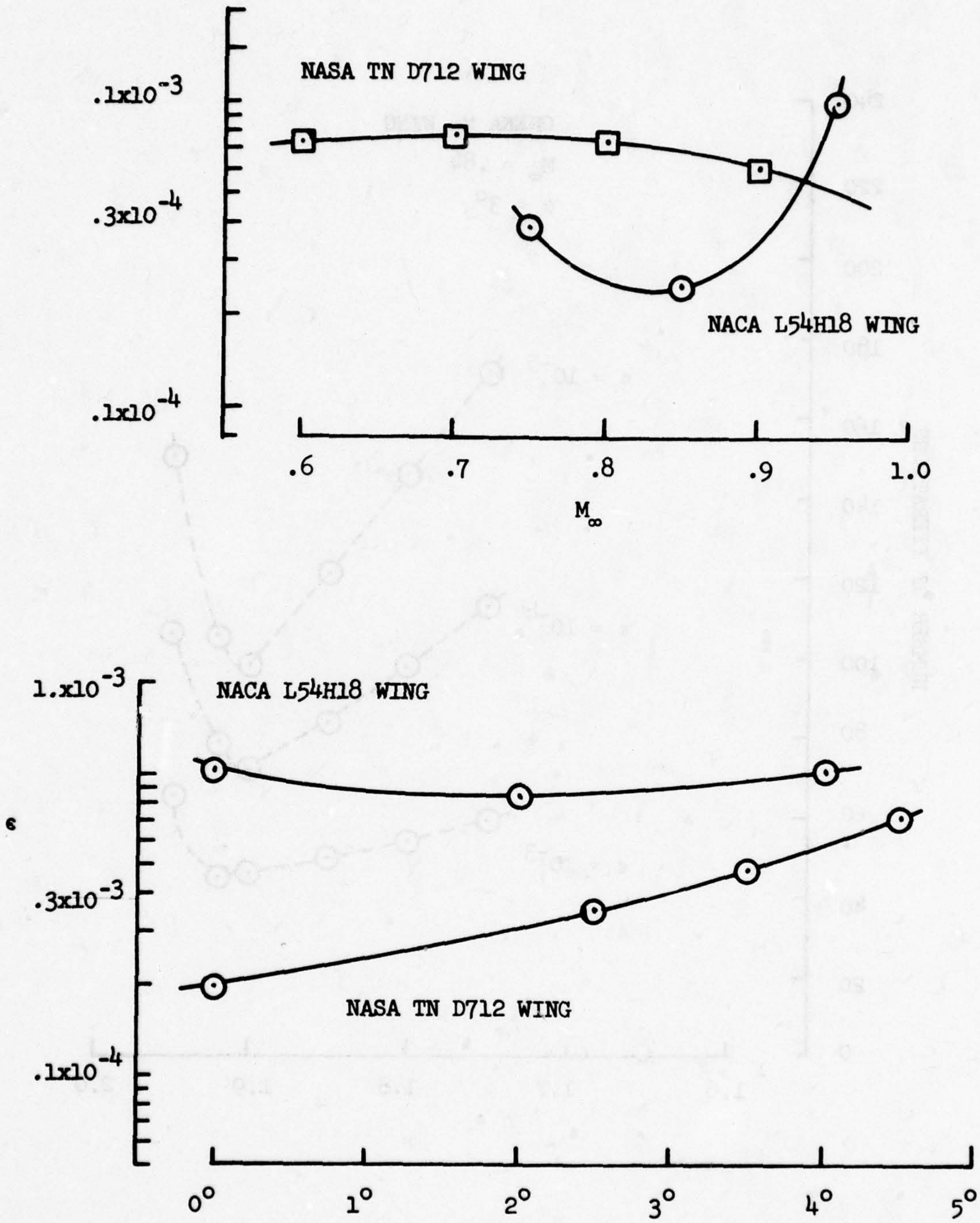


Figure 2 **Maximum Error After 220 Iterations for Different Mach Numbers, Angles-of-Attack and Configurations**

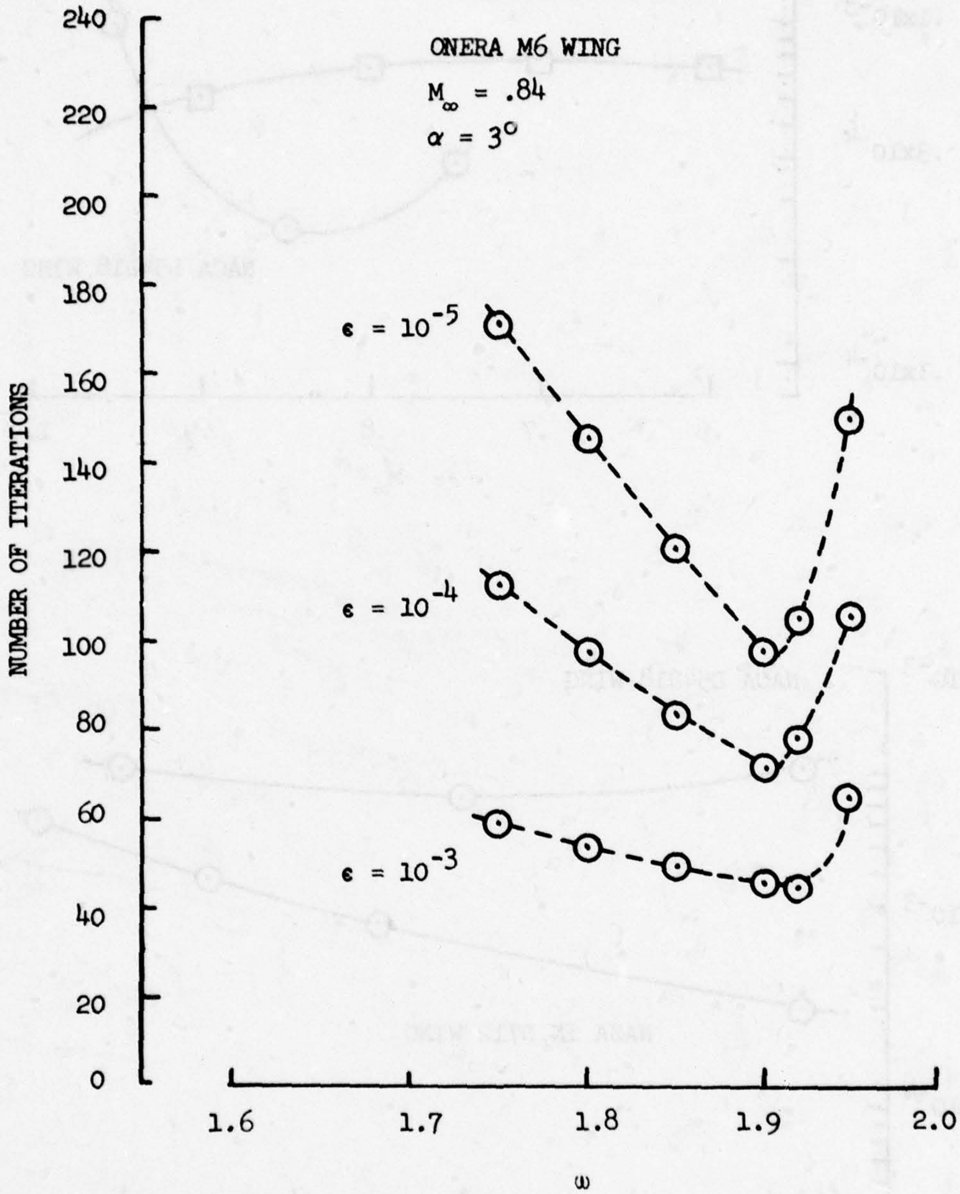


Figure 3 Variation of the Number of Iterations Required To Obtain Different Convergence Levels With The Relaxation Factor ω

3. INPUT PROCEDURE

a. General

The information is input to the program by cards and tapes or disk. The cards contain the basic program control, geometric and flight data. The tape or disk input is optional and contains the results of a previous solution. The old solution is used for a starting value for a new run in a manner similar (but not exactly analogous) to the practice of using a saved AIC matrix in panel method programs. The card input is very basic, with a NAMELIST option being used for the basic information, and a distinct block of data for each geometric feature, such as the planform, airfoils, and the body. The airfoil and body information can be input in a variety of methods, so that data decks based on the original Bailey-Ballhaus Code input format are not totally obsolete, while the new input format allows for increased flexibility. This flexibility was added in response to requirements on actual aircraft cases. Note that the NAMELIST symbols are different on IBM and CDC machines, so that two cards have to be changed when going from one machine to the other. The first five blocks of input data are for general use. A sixth block of input data allows the more experienced user to input other computational grids and mappings. A seventh block of input describes additional parameters in the NAMELIST which allow for further adjustments in the generated grids and the viscous-inviscid iteration procedure, as well as controls that are passed through the program and included in the input set for the Nash-Scruggs 3-D Boundary Layer Program.

The viscous-inviscid iteration requires a dual control approach, wherein the maximum number of iterations specified is performed between each boundary layer calculation. Thus, while an inviscid calculation might require 500 iterations maximum, FMAXIT, the appropriate viscous calculation would typically be carried out by specifying 70 inviscid iterations maximum, FMAXIT, and 7 viscous-inviscid iterations maximum, FIVSMX, so that the maximum number of inviscid iterations will be (FMAXIT) X (FIVSMX+1) = 560. The calculation always starts with the inviscid iteration, even when starting from a previously saved solution. A viscous solution terminates when either the viscous convergence criterion has been satisfied, or the maximum number of viscous-inviscid iterations has been exceeded. When performing a viscous calculation, the inviscid convergence criterion will terminate the inviscid iteration when it is satisfied, but it will not terminate the rest of the calculation. The program terminates with a

summary of the viscous iteration history whether the solution has fully converged or not.

The Murman model of Shock Boundary Layer interaction is exercised directly from the inviscid iteration and can be included independently at the rest of the viscous effects. It is best operated from a previous solution, or at least after a number of iterations have been made in order to establish the character of the solution.

It is highly recommended that the graphics package be employed and that an initial run with a new data set be limited to 5 cycles, after which both the print and plot output should be scrutinized in order to verify that the desired geometric case is, in fact, being simulated by the program. Once the data set is verified, the full runs can be submitted with confidence.

For some wing-body combinations, a small wiggle can develop in the solution near the leading edge of the wing at the root station. This is due to the irregular manner in which the bending mesh intersects the leading edge. The problem can be resolved without inputting the entire mesh externally by adjusting the fine mesh generating parameters described in the next section. The proper adjustment has been found to be to add more mesh points upstream of the leading edge, while also increasing the extent of the mesh upstream.

Finally, we note that the default mesh will produce an accurate inviscid solution. Although computing time can be reduced by overriding the default values and reducing the mesh density, the decrease in computing time will be accompanied by a decrease in the accuracy of the solution and extreme caution should be used if this approach is adopted.

b. Description of Input Data

GRUMMAN-AMES TRANSONIC VISCOUS WING-BODY CODE

The input data is contained in 7 basic blocks plus a title card. All numerical input is entered in F10 Format. Provision is made for additional input that overrides the internally generated meshes and mapping. The input stream occurs as follows:

GRUMMAN-AMES TRANSONIC VISCOUS WING-BODY CODE

Block		
	TITLE CARD	
1	CONTROL BLOCK	Combined in single NAMELIST
2	FLIGHT CONDITIONS	
3	PLANFORM	
4	AIRFOIL	
5	BODY	
6	Optional Mesh & Mapping Inputs	
7	Additional control parameters	

Block 1 - Control Block

The parameters controlling the various options in the code have been preset to default values to streamline the input. The default values reflect a "baseline" computation which has been found through experience to be generally satisfactory. However, some values of the control parameters must be overridden to accomplish specific tasks.

The control parameters in this block are input using NAMELIST*. Only those parameters that are to be changed from the default values need be read in. The NAMELIST variables, with default values shown in parenthesis, are listed below:

NAMELIST Variable	Default	Remarks
IDISK	(F)	T - start from old solution stored on unit 10. F - initialize potential field to zero.
MSHINT	(F)	T - initial conditions interpolated from old coarse mesh solution. F - no interpolation.

* Input data using NAMELIST must satisfy the following rules:

1. The first column on each card must be blank.
2. The first item must be the NAMELIST name preceded by a &; i.e., &LIST followed by a blank.
3. Data is input in the form variable = constant, each item being separated by commas; i.e., IDISK = T,RSUB=1.8,...
4. The last item must be &END.
5. The & above is for IBM; on CDC, the character is $.

NAMELIST Variable	Default	Remarks
ISAVE	(F)	T - save solution on unit 11. F - do not save solution.
IPLOT	(T)	T - save data for plotting on unit 12. F - do not save plot data.
SOLV	(T)	T - complete calculation. F - stop after geometry modeling.
WBCPRT	(T)	T - print wing surface slopes. F - omit print.
BBCPRT	(T)	T - print body boundary conditions. F - omit print.
BODY	(F)	T - wing-body combination. F - wing alone.
FCR	(T)	T - fully conservative differencing. F - non-conservative differencing.
ISPAN	(T)	T - include extra sweep terms in small disturbance equation. F - solve classical small disturbance equation.
YAW	(F)	T - two-dimensional yawed wing. F - three-dimensional configuration.
EXTMSH	(T)	T - use both fine interior and crude exterior grids. F - use fine interior grid only.
REMESH	(T)	T - initial calculation on crude interior grid before calculation defined by EXTMSH. F - no initial calculation.
IFINR	(F)	T - read in fine XIN, ETA and ZT grids. F - use internally generated fine grids.
ICRUDR	(F)	T - read in crude XIN, ETA and ZT grids. F - use internally generated crude grids.
JMESHR	(F)	T - read in initial XIN, ETA and ZT grids (if REMESH = T). F - use internally generated initial grids.
IMAPR	(F)	T - read in mapping of fine grid ξ=0 and ξ=1 lines. F - use internally generated mapping.

NAMELIST Variable	Default	Remarks
JMAPR	(F)	T - read in mapping of initial grid ξ=0 and ξ=1 lines. F - use internally generated mapping.
IBUMP	(F)	T - invoke Murman model for SBLI. F - no Murman Bump.
IVISC	(F)	T - do a viscous interaction calculation. F - inviscid calculation.
ITWIST	(F)	T - read in separate twist table. F - twist defined at airfoil input stations.
IFOILT	(T)	T - airfoil input consists of one (X,Y) pair per card. F - airfoil input consists of blocks of X's and Y's (old Ames input format).
IBODIN	(T)	T - simplified body input - automatic slopes. F - input detailed body slopes.
AXISYM	(F)	T - axisymmetric body (only if IBODIN=T). F - non-axisymmetric body.
AREA	(F)	T - Z body coordinates are areas rather than Z's. F - Z body coordinates are Z's.
IBLOUT	(F)	T - generate punched output for Nash B.L. code. F - no punched output.
FMAXIT	(500.)	Maximum number of iterations on interior grid.
FMXITN	(1.)	Number of fine interior grid iterations before crude exterior grid.
FMXITX	(1.)	Number of crude exterior grid iterations before fine interior grid.
FMXITI	(100.)	Maximum number of iterations on the initial grid.
FINCR	(1.)	Print increment for fine grid iterations.
FINCRX	(1.)	Print increment for crude grid iterations.
FINCRI	(1.)	Print increment for initial grid iterations.

NAMELIST Variable	Default	Remarks
RSUB	(1.7)	Subsonic relaxation factor for fine interior grid.
RSUBX	(1.6)	Subsonic relaxation factor for crude exterior grid.
RSUBI	(1.6)	Subsonic relaxation factor for initial grid.
RTEST	(.00001)	Convergence criterion for maximum potential error on fine interior grid.
RTESTI	(.0001)	Convergence criterion for maximum potential error on initial grid.
EPS	(1.)	Coefficient for ϕ_{xt} damping for fine grid.
EPSEX	(1.)	Coefficient for ϕ_{xt} damping for crude grid.
EPSI	(1.)	Coefficient for ϕ_{xt} damping for initial grid.
EMEXP(1)	(1.75)	Mach number exponent in nonlinear term (1.75 corresponds to modified Krupp scaling).
EMEXP(2)	(-.25)	Mach number exponent in wing boundary conditions (-.25 corresponds to modified Krupp scaling).
RFACT	(0.)	Riegel's Rule factor for modified wing slopes.
FIVSMX	(-1.)	Maximum number of viscous/inviscid iterations, values less than zero do not modify the wing slope boundary conditions.
FIVCON	(2.)	Viscous/inviscid interaction convergence criteria, FIVCON = 1 tests for convergence on Cp change, FIVCON = 2 tests for convergence on lift.
EPSVIS	(.01)	Convergence criterion for viscous inviscid iteration.
FLWRIT	(0.)	Viscous iteration output =0. Normal Output =1. Abbreviated Output

NAMELIST Variable	Default	Remarks
FIOUTP	(0.)	Type of strip boundary layer output, FIOUTP = 0 is the minimum amount, = 1 provides detailed chordwise distributions, = 2 provides boundary layer profiles also.
FISTEP	(10.)	B.L. steps between b.l. profile outputs if FIOUTP = 2.

Block 2 - Flight Conditions

This input set continues in the same NAMELIST as Block 1. Variables contained in this block are (default values in parenthesis):

NAMELIST Variable	Default	Remarks
MACHNO	(.9)	Freestream Mach number.
ALPHAW	(0.°)	Wing angle-of-attack relative to the freestream velocity in degrees.
ALPHAB	(0.°)	Body angle-of-attack relative to the freestream velocity in degrees.
RE	(10.)	Reynolds number/10^6 based on mean aerodynamic chord.
GAMMA	(1.4)	Ratio of specific heats.
XTRNT	(.05)	Boundary layer transition location on upper surface -- fraction of local chord.
XTRNB	(.05)	Boundary layer transition location on lower surface -- fraction of local chord.

Block 3 - Planform Specification

(If the yawed wing option is requested, use the yawed wing input.)

FINITE WING INPUT

Card #	Format	Field	Name	Remarks
P1	Literal		PTITLE	80 characters describing wing definition.
P2	8F10.0	1	YROOT=0	Y-coord. of root for reference trapezoidal wing (RTW).
		2	XLER	X-coord. of leading edge at root for RTW.
		3	XTER	X-coord. of trailing edge at root for RTW.
		4	YTIP	Y-coord. of tip for RTW.
		5	XLET	X-coord. of leading edge at tip for RTW.
		6	XTET	X-coord. of trailing edge at tip for RTW.
		7	XMOM	Moment reference.
		8	SREF	Wing half-reference area -- if 0., code calculates SREF for RTW.
P3	Literal		PTITLE	80 characters describing LEADING EDGE.
P4	8F10.0	1	XNLE	Number of X, Y pairs used to define L.E.
P5	8F10.0	1	YLEI(I)	Y-coord. of L.E.
		2	XLEI(I)	X-coord. of L.E. at this Y.

NOTE: Card P5 is read XNLE times.

Card #	Format	Field	Name	Remarks
P6	Literal		PTITLE	80 characters describing T.E.
P7	8F10.0	1	XNTE	Number of X, Y pairs used to define T.E.

Card #	Format	Field	Name	Remarks
P8	8F10.0	1	YTEI(I)	Y-coord. of T.E.
		2	XTEI(I)	X-coord. of T.E. at this Y.

NOTE: Card P8 is read XNTE times.

INFINITE YAWED WING OPTION

P1	Literal		PTITLE	80 character title.
P2	8F10.0	1	SWEEP	Sweep angle of Infinite Yawed Wing in degrees.

Block 4 - Airfoil Specification

INPUT FORMAT

1. Default Option, IFOILT = T (if IFOILT = F, skip to INPUT FORMAT 2.).

Card #	Format	Field	Name	Remarks
A1	Literal		ATITLE	80 characters describing wing definition.
A2	8F10.0	1	XNPAN	Number of spanwise stations required to define wing geometry ($2 \le XNPAN \le 11$).

NOTE: Cards A3-A9 are repeated XNPAN times.

Card #	Format	Field	Name	Remarks
A3	Literal		ATITLE	80 characters describing this section.
A4	8F10.0	1	YP	Spanwise location of this section - non-dimensionalized with respect to semispan.
		2	THETP	Wing twist at this span station (in degrees).
		3	THICK	Thickness scaling for this span station; i.e., 1.0 implies no change to coordinates.
		4	XNWSEC	=1.0 - new airfoil coordinates for this span station will follow. =0.0 - the coordinates for this span station are the same as the previous station.

NOTE: If XNWSEC = 0, go back to card A3 for next span station, if any.

Card #	Format	Field	Name	Remarks
A5	8F10.0	1	ZSYM	=0.0 - asymmetric section, upper and lower surface coordinates will follow. =1.0 - symmetric section, only upper surface coordinates will follow.
		2	FNU	Number of upper surface coordinates.
		3	FNL	Number of lower surface coordinates.
		4	XKSMTH	Number of coordinate smoothings to be performed.

Card #	Format	Field	Name	Remarks
A6	Literal		ATITLE	80 characters - typically upper surface.
A7	8F10.0	1	XU	Upper surface X coordinate in any convenient coordinate system.
		2	ZU	Upper surface Z coordinate in same coordinate system as X.

NOTE: Repeat card A7 FNU times.
If ZSYM = 1.0, go back to card A3 for next span station, if any.

Card #	Format	Field	Name	Remarks
A8	Literal		ATITLE	80 characters - typically lower surface.
A9	8F10.0	1	XL	Lower surface X coordinates in same coordinate system as cards A7.
		2	ZL	Lower surface Z - coordinate in same coordinate system as cards A7.

NOTE: Repeat Card A9 FNL times.
Go back to card A3 for next span station, if any.
Airfoil coordinates run from leading edge to trailing edge.
The leading edge point is input twice for asymmetric airfoils.

If IFOILT= T, skip Input Format 2.

INPUT FORMAT

2. Original Bailey-Ballhaus airfoil input format, IFOILT = F.

Card #	Format	Field	Name	Remarks
A1	Literal		ATITLE	80 characters describing airfoil section.
A2	8F10.0	1	XNPAN	Number of span stations at which airfoil ordinates are input (2.≤XNPAN≤11.).
		2	FNU	Number of upper surface ordinates ≤ 90.
		3	FNL	Number of lower surface ordinates ≤ 90.
		4	XKSMTH	Number of times surface slopes are smoothed.

Card #	Format	Field	Name	Remarks
A3	8F10.0	1,3,5,7	YP(N)	Fraction of semispan at which airfoils are defined.
		2,4,6,8	THETP(N)	Twist angle at YP, in degrees (positive is LE up).

NOTE: Card A3 is repeated XNPAN/4. times.

A4	8F10.0	1,2,...8	XINU(I)	x/c at which airfoil upper surface ordinates are input.

NOTE: Card A4 is repeated FNU/8. times.

A5	8F10.0	1,2,...8	XINL(I)	x/c at which airfoil lower surface ordinates are input.

NOTE: Card A5 is repeated FNL/8. times.

A6	L5	1	ISAME	F - input airfoil ordinates. T - use previously defined airfoil.

NOTE: If ISAME = T, omit cards A7 and A8.

A7	8F10.0	1,2,...8	ZUP(I,N)	z/c for airfoil upper surface.

NOTE: Card A7 is repeated FNU/8. times.

A8	8F10.0	1,2,...8	ZLP(I,N)	z/c for airfoil lower surface.

NOTE: Card A8 is repeated FNL/8. times.
ISAME must be false at first span station.
Cards A6-A8 are repeated XNPAN times.

SEPARATE TWIST TABLE INPUT OPTION

If a separate table of twists is requested, the twists input on the airfoil specification cards are ignored and the following input is required:

T1	Literal		TTITLE	80 character title.
T2	8F10.0	1	XNTWST	The number of span stations at which the twist is input (3≤XNTWST≤11).
T3	8F10.0	1	YTWST	The y/C span station at which the twist is given (must be monotonically increasing).
		2	THETP	The twist angle at YTWST in degrees. Nose-up is positive twist.

NOTE: Card T3 is repeated XNTWST times.

Block 5 - Body Specification

INPUT FORMAT

1. Default Option, Body Lines Input, IBODIN = T (if IBODIN = F, skip to Input Format 2.).

Card #	Format	Field	Name	Remarks
B1	Literal		BTITLE	80 characters describing fuselage shape.
B2	8F10.0	1	ZWNGWL	Z location of wing plane.
B3	Literal		BTITLE	80 characters, typically upper center line.
B4	8F10.0	1	FNUCL	Number of fuselage stations to define upper center line ≤ 90.
B5	8F10.0	1	XUCL(I)	Fuselage station.
		2	ZUCL(I)	Z coordinate of body upper center line.

NOTE: Card B5 is repeated FNUCL times.
If AXISYM=T, skip cards B6-B14; i.e., the rest of the cards in this input block.
If AREA=T also, ZUCL(I) above is body area.

Card #	Format	Field	Name	Remarks
B6	Literal		BTITLE	80 characters, typically lower center line.
B7	8F10.0	1	FNLCL	Number of fuselage stations to define lower center line ≤ 90.
B8	8F10.0	1	XLCL(I)	Fuselage station.
		2	ZLCL(I)	Z coordinate of body lower center line.

NOTE: Card B8 is repeated FNLCL times.

Card #	Format	Field	Name	Remarks
B9	Literal		BTITLE	80 characters, typically max half-bredth line in X-Z plane.
B10	8F10.0	1	FNMHB	Number of fuselage stations to define max half-bredth line in X-Z plane ≤ 90.

Card #	Format	Field	Name	Remarks
B11	8F10.0	1	XZMHB(I)	Fuselage station.
		2	ZMHB(I)	Z coordinate of max half-bredth line.

NOTE: Card B11 is repeated FNMHB times.

B12	Literal		BTITLE	80 characters, typically max half-bredth line in X-Z plane.
B13	8F10.0	1	FMHBY	Number of fuselage stations to define max half-bredth line in X-Y plane ≤ 90.
B14	8F10.0	1	XYMHB(I)	Fuselage station.
		2	YMHB(I)	Y coordinate of max half-bredth line.

NOTE: Card B14 is repeated FMHBY times.

If IBODIN = T, skip Input Format 2.

INPUT FORMAT

2. Body Slope Input, IBODIN = F.

B1	Literal		BTITLE	80 characters describing fuselage shape.
B2	8F10.0	1	ZRBU	Z location of top of BCSS (Boundary Condition Support Surface).
		2	ZRBL	Z location of bottom of BCSS.
		3	YRB	Y location of side of BCSS.
		4	ZWNGWL	Z location of wing plane.
B3	8F10.0	1	FNRBU	Number of X stations for slope input on BCSS upper surface ≤ 90.
B4	8F10.0	1,2,...8	XRBU(J)	X stations.

NOTE: Card B4 repeated FNRBU/8. times.

Card #	Format	Field	Name	Remarks
B5	8F10.0	1	FIBUD	Number of Y stations for slope input on BCSS upper surface ≤ 10.
B6	8F10.0	1,2,...8	ETABU(K)	Y stations.

NOTE: Card B6 repeated FIBUD/8. times.

Card #	Format	Field	Name	Remarks
B7	8F10.0	1,2,...8	RBCU(J,K)	Slopes on BCSS upper surface.

NOTE: Card B7 is repeated FNRBU/8. times <u>for</u> <u>each</u> <u>ETABU</u>.

Card #	Format	Field	Name	Remarks
B8	8F10.0	1	FNRBL	Number of X stations for slope input on BCSS lower surface ≤ 90.
B9	8F10.0	1,2,...8	XRBL(J)	X stations.

NOTE: Card B9 is repeated FNRBL/8. times.

Card #	Format	Field	Name	Remarks
B10	8F10.0	1	FIBLD	Number of Y stations for slope input on BCSS lower surface ≤ 90.
B11	8F10.0	1,2,...8	ETABL(K)	Y stations.

NOTE: Card B11 is repeated FIBLD/8. times.

Card #	Format	Field	Name	Remarks
B12	8F10.0	1,2,...8	RBCL(J,K)	Slopes on BCSS lower surface.

NOTE: Card B12 is repeated FNRBL/8. times <u>for</u> <u>each</u> <u>ETABL</u>.

Card #	Format	Field	Name	Remarks
B13	8F10.0	1	FNRBS	Number of X stations for slope input on BCSS side ≤ 90.
B14	8F10.0	1,2,...8	XRBS(J)	X stations.

NOTE: Card B14 repeated FNRBS/8. times.

Card #	Format	Field	Name	Remarks
B15	8F10.0	1	FIBS	Number of Z stations for slope input on BCSS side ≤ 10.
B16	8F10.0	1,2,...8	ZBOD(L)	Z stations.

NOTE: Card B16 repeated FIBS/8. times.

Card #	Format	Field	Name	Remarks
B17	8F10.0	1,2,...8	FY(J,L)	Slopes on BCSS side.

NOTE: Card B17 repeated FNRBS/8. times <u>for</u> <u>each</u> <u>ZBOD</u>.

Block 6 - Optional Mesh and Mapping Inputs

The mesh and mapping inputs are input last in the following order:

Initial Mesh (Cards F1-F5) if, and only if, REMESH = T, JMESHR = T

Initial Mapping (Cards M1-M8) if, and only if, REMESH = T, JMAPR = T

Interior Mesh (Cards F1-F5) if, and only if, IFINR = T

Interior Mapping (Cards M1-M8) if, and only if, IMAPR = T

Exterior Mesh (Cards C1-C5) if, and only if, EXTMSH = T, ICRUDR = T

NOTE: See Section c) for a discussion of the construction of appropriate meshes and a description of the internally generated meshes.

Mesh Parameters For Initial and Interior Meshes

Card #	Format	Field	Name	Remarks
F1	Literal	1	TITLEM	80 characters describing initial or interior mesh.
F2	8F10.0	1	FJMAX	Number of streamwise mesh points (≤ 90.).
		2	FKMAX	Number of spanwise mesh points (≤ 30.).
		3	FLMAX	Number of vertical mesh points (≤ 20.).
		4	FKTIP	First mesh point beyond wing tip.
		5	FLWNGU	ZT mesh index of first point above wing plane.
F3	6F10.0	1,2,...8	XIN(J)	X mesh along center line.

NOTE: Card F3 is repeated FJMAX/8. times.

Card #	Format	Field	Name	Remarks
F4	8F10.0	1,2,...8	ETA(K)	ETA coordinate at mesh points.

NOTE: Card F4 is repeated FKMAX/8. times.

Card #	Format	Field	Name	Remarks
F5	8F10.0	1,2,...8	ZT(L)	ZT coordinate at mesh points.

NOTE: Card F5 is repeated FLMAX/8. times.

Mapping Parameters For Initial and Interior Meshes

Card #	Format	Field	Name	Remarks
M1	8F10.0	1	FNSO	Number of segments defining XI = 0 line; FNSO ≤ 6.
M2	8F10.0	1	FKXO	K index of outboard edge of segment.
		2	FNXO	Number of Y, X pairs defining segment; FNXO ≤ 10.
M3	8F10.0	1,3,5,7 2,4,6,8	YXO XKO	Y, X pairs defining segment.

NOTE: Card M3 is repeated FNXO/4. times.

Card #	Format	Field	Name	Remarks
M4	8F10.0	1	DXRO	DX/DY at inboard edge.
		2	DXTO	DX/DY at outboard edge.

NOTE: Cards M2, M3, and M4 are repeated FNSO times.

Card #	Format	Field	Name	Remarks
M5	8F10.0	1	FNS1	Number of segments defining XI = 1 line; FNS1 ≤ 6.
M6	8F10.0	1	FKX1	K index of outboard edge of segment.
		2	FNX1	Number of Y, X pairs defining segment; FNX1 ≤ 10.
M7	8F10.0	1,3,5,7 2,4,6,8	YX1 XX1	Y, X pairs defining segment.

NOTE: Card M7 is repeated FNX1/4. times.

Card #	Format	Field	Name	Remarks
M8	8F10.0	1	DXR1	DX/DY at inboard edge.
		2	DXT1	DX/DY at outboard edge.

NOTE: Cards M6, M7 and M8 are repeated FNS1 times.

Mesh Parameters for Exterior Mesh

Card #	Format	Field	Name	Remarks
C1	Literal	1	TITLEM	80 characters describing crude mesh.
C2	8F10.0	1	FJMAXX	Number of streamwise mesh points (≤ 30.).
		2	FKMAXX	Number of spanwise mesh points (≤ 20.).
		3	FLMAXX	Number of vertical mesh points (≤ 20.).
		4	FKTIPX	First ETAX mesh point beyond wing tip.
		5	FLWGUX	ZTX mesh index of first point above wing plane.
C3	8F10.0	1,2,...8	XINX(J)	X mesh along center line.

NOTE: Card C3 is repeated FJMAXX/8. times.

Card #	Format	Field	Name	Remarks
C4	8F10.0	1,2,...8	ETAX(K)	ETA coordinate at mesh points.

NOTE: Card C4 is repeated FKMAXX/8. times.

Card #	Format	Field	Name	Remarks
C5	8F10.0	1,2,...8	ZT(L)	ZT coordinate at mesh points.

NOTE: Card C5 is repeated FLMAXX/8. times.

Block 7 - Additional Control Parameters

These parameters supply additional control for several options. For most applications of the code, the default values are recommended. The default values may be overridden by using the NAMELIST described for Block 1.

NAMELIST Variable	Default	Remarks
Murman Bump Parameters		
F	(1.)	Relaxation factor for Murman Bump and controls the fraction of the shock movement allowed for the bump origin between iterations.
SHIFT	(0.)	Percent chord shift of shock location. Positive upstream allows the bump origin to be located slightly upstream of shock.
FBSTRT	(0.)	Number of interior mesh iterations before start of Murman Bump.
FBPRNT	(0.)	Number of interior mesh iterations between additional Murman Bump printout, if FBPRNT = 0., no printout.

Fine Mesh Parameters - these parameters control the automatic generation of the fine interior mesh (IFINR = F).

NAMELIST Variable	Default	Remarks
DXL	(.008)	ξ-mesh spacing at leading edge; i.e., leading edge is placed at DXL/2.
DXT	(.020)	ξ-mesh spacing at trailing edge; i.e., trailing edge is nominally placed at $\xi = 1.$
DXMX	(.030)	Maximum ξ-mesh spacing on the wing.
FNF	(8.)	Number of grid lines upstream of $\xi = 0.$ line.
FNB	(8.)	Number of grid lines downstream of the $\xi = 1.$ line.
XDST	(1.88)	Overall length of the ξ-mesh.
XLG	(.44)	Upstream extent of the ξ-mesh.

NAMELIST Variable	Default	Remarks
FIOUT1	(0.)	= 0., no general mesh generation output. = 1., general mesh generation output.
FIOUT2	(0.)	= 0., no detailed mesh generation output. = 1., detailed mesh generation output.

Initial Mesh Parameters - these parameters control the automatic generation of the initial mesh (REMESH = T, JMESHR = F).

DXLI	(.020)	ξ-mesh spacing at leading edge; i.e., leading edge is placed at DXLI/2.
DXTI	(.040)	ξ-mesh spacing at trailing edge; i.e., trailing edge is nominally placed at $\xi = 1.$
DXMXI	(.075)	Maximum ξ-mesh spacing on the wing.
FNFI	(12.)	Number of grid lines upstream of $\xi = 0.$ line.
FNBI	(10.)	Number of grid lines downstream of $\xi = 1.$ line.
XDSTI	(11.)	Overall length of the ξ-mesh.
XLGI	(5.)	Upstream extent of the ξ-mesh.
FIOUT1	(0.)	(Must be the same as interior mesh.)
FIOUT2	(0.)	(Must be the same as interior mesh.)

Viscous Iteration Parameters (IVISC = T)

RELBL	(.6)	Relaxation factor for the modification of the slope boundary conditions between inviscid calculations.
EXTNDU	(0.97)	The fraction of the chord after which the boundary layer slope on the upper surface is linearly extrapolated from its value and rate of change at EXTNDU.
EXTNDL	(1.0)	The same as EXTNDU, except applied to the lower surface. For supercritical airfoils, no extrapolation is necessary.

NAMELIST Variable	Default	Remarks
FKI	(0.)	The inboard interaction history is printed at span station FKI. If FKI = 0., the history is printed at the first span station outboard of the root station.
FKO	(0.)	Same as FKI, but for outboard stations. If FKO = 0., the history is printed at the first span station inboard of the tip span station.

Nash Boundary Layer Parameters (IBLOUT = T)

NOTE: See Volume III for a complete description of the input data set for the 3-D Boundary Layer Program; these inputs are provided in order to exercise control over the program indirectly, so that the 3-D B.L. code can be exercised sequentially in a multi-step job.

NAMELIST Variable	Default	Remarks
FIT	(10.)	Maximum number of iterations allowed in numerical procedure at each streamwise row.
FIOIT	(1.)	Output of numerical iteration history = 0. no output = 1. full output.
FIOPRF	(1.)	Output of velocity profiles at each station = 0. no output = 1. full output.
FIPNCH	(0.)	= 0. do not punch output for plotting. = 1. punch output for plotting on unit 7.
FKSMTH	(0.)	Number of smoothings of input pressure distributions (if desired).
CONV	(.0005)	Convergence criterion for numerical iteration.
SCALE	(.0833)	Reference Length Scale, in feet.
PRES	(6.)	Static Pressure, in psi.
TEMP	(390.)	Static Temperature, in degrees Rankine.

c. **Mesh and Mapping Generation**

It is now widely appreciated that the generation of an adequate computational mesh for the numerical simulation of the flowfield about general aircraft configurations is one of the most difficult problems facing the aerodynamicist. This problem must be solved if the research methods presently being developed for idealized configurations are to be extended to the complex geometric configurations that aerodynamicists require. The present code bypasses much of the difficulty by the use of the small disturbance boundary conditions consistent with the governing equation being solved. This allows the wing surface to be approximated by a planar sheet of zero thickness upon which the surface slopes are specified. Correspondingly, the body boundary conditions are applied on an infinitely long constant cross-sectional rectangle termed the boundary condition support surface, BCSS. The resulting grid system requires only the most basic aspects of the planform and body geometry in order to construct an acceptable computational mesh.

Three X-Y-Z grid systems are generated internally by the program, or optionally input by the user. In addition, the planform mapping required for the inner fine mesh is either internally generated or input. In order to reduce the complexity of the input, each grid system must be input together; i.e., X and Y cannot be generated internally and Z read in. If this type of input is desired, the program should be submitted once with SOLV = F and the generated X and Y grids should be added to the input data set. The initial and fine meshes are both placed on a mapped planform, such that the input X's refer to the intersection of the mapping at the center line. The crude mesh is Cartesian and presents several different problems. The purpose of this section is to describe how these meshes are generated internally and to provide guidance to the user who wishes to construct his own mesh.

The fine X-Y-Z grid is described first. The X and Z grids can be introduced directly from the typical 2-D programs. The X-mesh that is generated internally is due to Dr. T. Holst of NASA Ames and represents an improvement over the X mesh originally used by Krupp (Reference 5) for his small disturbance calculations. The spacing of the mesh should be reduced about the nose and trailing edge with the mesh opening up both upstream and downstream of the airfoil. In the inner mesh, the upstream and downstream boundaries extend about one-half of the chord length from the foil, with the foil leading edge being placed half way between the grid lines at the leading edge, such that the first

mesh line falls about one-half percent of the chord behind the leading edge and on the trailing edge, with a typical spacing of 1-1/2 to 2 percent of the foil. The mesh variation should be constructed so that the second difference of the mesh distribution varies smoothly. The program provides a tabulation of this difference in the output from the initial setup. Failure to enforce this condition can lead to both convergence and accuracy problems. Figure 4 provides an example of the typical ΔX variation. When considering a three-dimensional case, the X mesh is input in physical dimensions, based on the intersection of the mapping with the center line. Figure 5 illustrates the procedure. If the mesh distribution is generated based on a unit chord, then some preliminary manipulation of the mesh is necessary. Typically, 50-60 grid points are adequate for the X mesh in the fine grid. Figure 6 shows an example of the change in the solution with various X meshes, so that we can observe that the general character of the solution is fairly constant between the grid densities, with the increased grid density serving mainly to sharpen the details of flowfield. Another X-grid which has been tested is the grid due to Albone et al (Reference 6). This grid can be easily programmed but requires about 8 empirical constants and leads to a large number of mesh points. However, the reader should be aware of this X-grid if other candidates are being investigated.

The solution has been found to be relatively insensitive to the Z grid used. Figure 7 shows 3 different meshes that were used with the resulting changes in the wing forces and pressures varying within plotting accuracy, as shown in Table II. The wing is assumed to be located at $Z = 0$ and halfway between the first grid point above and below the wing. The baseline mesh shown in the figure is a "canned" mesh employed in the program. The usual tangent mesh would be adequate also. The grid extends approximately 1.8 chords above and below the wing.

The Y-grid in the inner mesh is simply an evenly divided set of lines that provide 28 span stations on the wing. This grid has been acceptable in all calculations performed to date. The user might consider spacing the grid more closely in regions near the wing root, planform kinks and the wing tip in order to increase the local resolution. Some experimentation has indicated that adjustment of the Y-grid can lead to a large improvement in the convergence rate, however, this property seems to depend on the particular configuration and the automatic generation seems to work well with the present scheme. This is, however, an area for experimentation on particular configurations.

The inner X mesh produces a variable number of streamwise points depending on the particular configuration. This is a result of the requirement that the inner mesh fully "cover" the planform. For wing-body configurations, the mapping does not coincide with the planform and since the X mesh is actually centered around the $\xi = 0$ and $\xi = 1$ lines, the planform can "stick out" of the mesh as will be illustrated below. The automatic mesh generator ensures that the inner mesh covers the planform; if the user inputs the X-grid and it fails to cover the planform, the program stops with a message indicating that this condition is not met.

The initial mesh is actually an expanded version of the fine mesh. Once again, the X-mesh is generated using the XMESH subroutine, with a different set of input values which results in a mesh of about 40 streamwise points stretching about 5 chord lengths upstream and downstream of the airfoil. The Y mesh extends to about 1-2/3 semispans with 14 evenly spaced lines on the wing, and then gradually enlarged spacing until the twentieth span station is located at 1-2/3 semispans. We should note that the mesh spacing should be generated with difference relations. Care should be taken when analytic functions are used because it is easy to construct analytic functions which produce uneven differences when points are selected from them. Typical formulas usually look like:

$$\Delta\eta_i = A_i \Delta\eta_{i-1}$$

where A_i is either constant or a "slow" variable. The Z-grid is the same as the fine grid, except that the spacings have been multiplied by a factor of 5 so that the extent of the grid increases from 1.8 chords above and below the wing to about 9 chords above and below.

The crude grid is Cartesian, which adds some special requirements to the grid construction. The Z-grid remains simple, with the exception that two Z-grid lines must be located between the top and bottom of the body. Special provisions have been included in the automatic grid generation in order to ensure that this requirement is met, while the failsafe feature of the code terminates the calculation if the user generated grid violates this condition (the same 2 point rule also holds for the Y-grid).

The basic crude Z-grid is given by the cubic:

$$Z = a(L-1/2) + b(L-1/2)^3$$

where L is the grid index and a and b are the appropriate constants such that

at $L = 1$; $Z = Z_1$, and at $L = LM$, $Z = Z_{MAX}$, where the L's run above the wing from 1 to LM (typically 10) with $Z_{MAX} = 10$ chord lengths above the wing and $Z1 = .12$ chord lengths above the wing. The Y-grid is constructed to provide 14 span stations on the wing and open up rapidly outboard of the eighteenth and last span station, which is at 5 semispans. Due to the Cartesian mesh in the crude grid, the X-grid requires some special considerations. The grid must be constructed so that at least 4 crude X mesh grid points cover the wing chord at each span station. This requires a special mesh generator, which provides a mesh that meets this criterion. If there are less than 4 points at any span station, the accuracy may be severely reduced. Normally, the full streamwise points in a crude X-grid are required in order to achieve this criterion and also provide a grid that extends 10 root chords in front of and behind the wing.

The mapping aligns the inner fine grid with the majcr portion of the wing. This is the natural coordinate system for the wing calculations. The mapping is given by:

$$\xi(X,Y) = \frac{X - X(Y)_{\xi=0}}{X(Y)_{\xi=1} - X(Y)_{\xi=0}} \tag{1}$$

where $X_{\xi=0}$ and $X_{\xi=1}$ are the mapping lines that must be defined, either through internal generation or as additional input. Generally, the $X_{\xi=0}$ line should coincide with the planform leading edge and $X_{\xi=1}$ coincides with the planform trailing edge. This is not necessarily required, however, and several instances demand a departure of the mapping lines from the planform. On the fine grid, the mapping must bend such that the body is intersected perpendicularly at the body side ($\xi_Y = 0$ has been assumed in the program at the body side). The initial grid also requires that the mapping be bent outboard of the tip so that the $\xi = 1$ and $\xi = 0$ lines do not cross in the physical plane. Figure 8a provides an illustration of the mesh bending. The initial mesh bends such that the $\xi = 1$ and $\xi = 0$ lines are bent to the average angle of the lines at the trailing edge. The bending takes place over a distance which is one-half the lateral distance between the tip and the point at which the meshes would intersect.

The mapping is input by the user as X-Y pairs along a number of segments, with the slopes at the end points of each segment also prescribed. The most critical area of the mapping is the wing root bending and we will now describe a procedure which works well for this bending. Consider the fine mesh mapping

input for a wing-body case with a straight leading edge. Determine the Y-grid points and input a 3 segment $\xi = 0$ line as follows. Segment 1 is a 0 (zero) slope line that runs from Y = 0 to the first Y-grid line outboard of the root. The second segment covers 4 grid lines and has a 0 (zero) slope at the inboard station ($Y_{root} + 1$) and the slope of the leading edge at the outboard end of the segment ($Y_{root} + 4$). The third segment corresponds to the leading edge. The mapping would be constructed in reverse order, with the third segment input first. Figure 8b provides a sketch of this example. Segment 3 requires two X,Y pairs for definition and the slopes are the same as the planform. Segment 2 is, of course, the key ingredient of the mapping and an enlarged sketch of this segment is shown in Figure 8c. Four X,Y pairs are used to define this segment. The fourth point is identical with the first point of Segment 3, with the same slope. Point number 3 of Segment 2 continues to coincide with the leading edge and the third Y line past the wing root. Point number 2 is the key point in the construction. This point has a Y location on the second grid line past the wing root and an X location such that the slope between points number 2 and 3 is one-half the slope between number 3 and 4. Once point number 2 is located, point number 1 is easily located at the first Y mesh line past the root and with the same X value as point number 2. Segment 1 is finally constructed with two X,Y pairs describing its location, one pair at the center line, the other located at the same point as point number 1 of Segment 2. The slope is zero at both end points and the X value of both points is the same as point number 1 of Segment 2. This description should be sufficient for the user to begin generating his own mappings, which would be constructed in a similar manner for the trailing edge and planform breaks. We expect, however, that the vast majority of the user's will opt to allow the program to generate the mapping internally.

In regions where the mapping and planform do not coincide, the solution can develop inaccuracies due to the extreme non-uniformity of the grid, which actually crosses the leading edge. Riegel's Rule is automatically employed in such situations because this rule tends to compensate for the uneven spacing near the leading edge.

The above description of the mesh and mapping generation describes the methods which have been used successfully for a number of years. An experienced user can construct his own meshes and mapping in approximately one day and the results will be customized to the particular requirements of the calculation.

The automatic generators provide good results for all the configurations studied to date, but the automatic generation does not provide the specialized grid and mapping construction that might be desired in some applications.

TABLE II

Z GRID EFFECTS ON SOLUTION

OVERALL FORCE COMPARISON

Z Mesh	Z_{max}	C_L	C_D	C_M
Heightened	1.01	1.0678	.09978	-1.2961
Basic	1.83	1.0528	.09804	-1.2687
Reduced	2.68	1.0522	.098973	-1.2752

SURFACE PRESSURE COMPARISON

		η = .24			η = .80	
Cp Upper	x/c = .21212	.51522	.96346	.23221	.53083	.96210
Z Mesh						
"short"	-.488	-.466	-.885	-.4851	-.53342	-.92105
basic	-.4935	-.468	-.9178	-.5041	-.53236	-.93626
"tall"	-.48139	-.4587	-.8775	-.48057	-.52875	-.91364
Cp Lower						
"short"	-.17065	-.37696	.5591	-.26909	-.09758	.56447
basic	-.1736	-.39074	.5044	-.2795	-.09093	.51879
"tall"	-.1639	-.3688	.5459	-.26655	-.10204	.55188

TACT WING M = .95 $\alpha = 5.2^{\circ}$

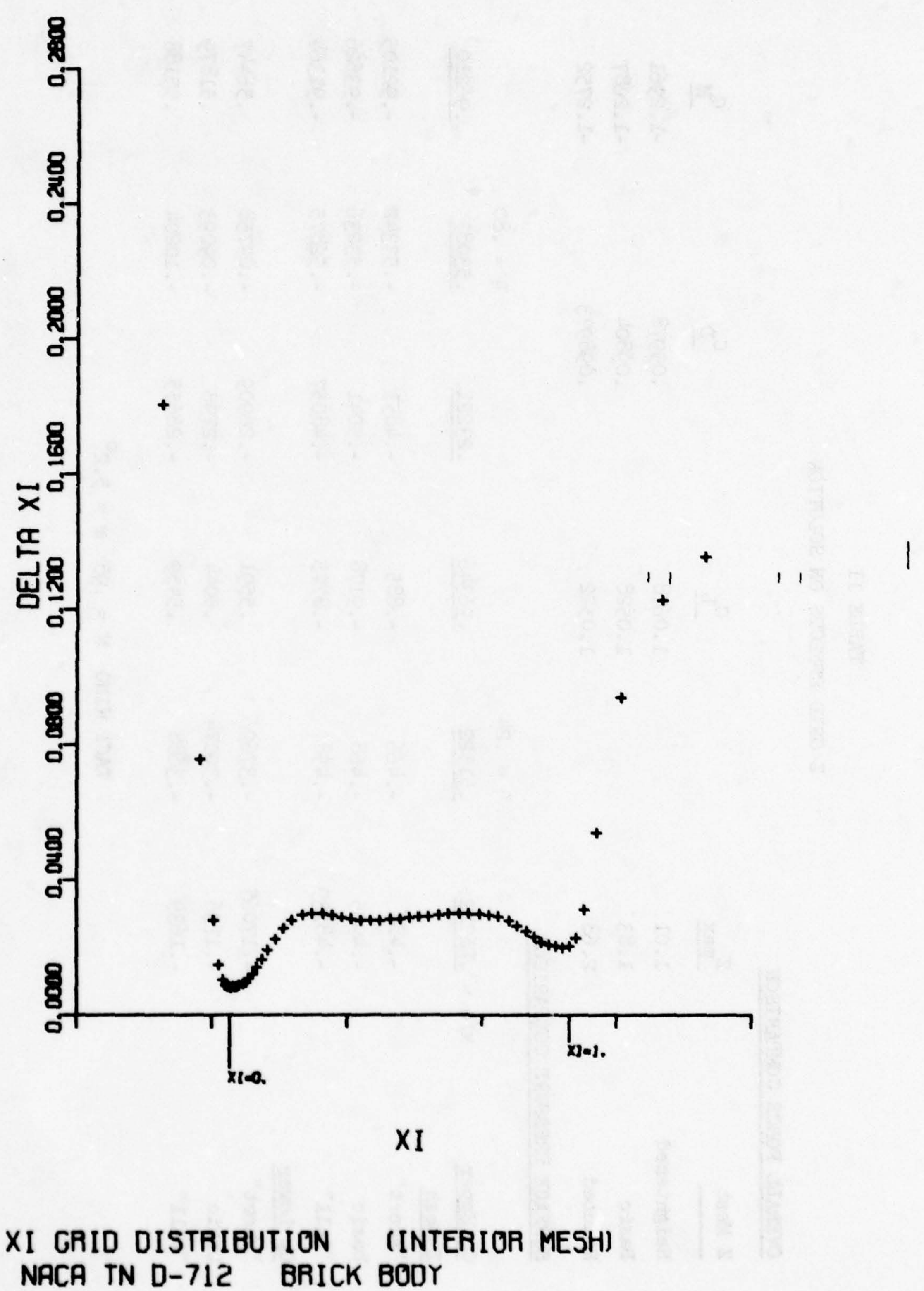


Figure 4 ΔX Variation For the Internally Generated Mesh

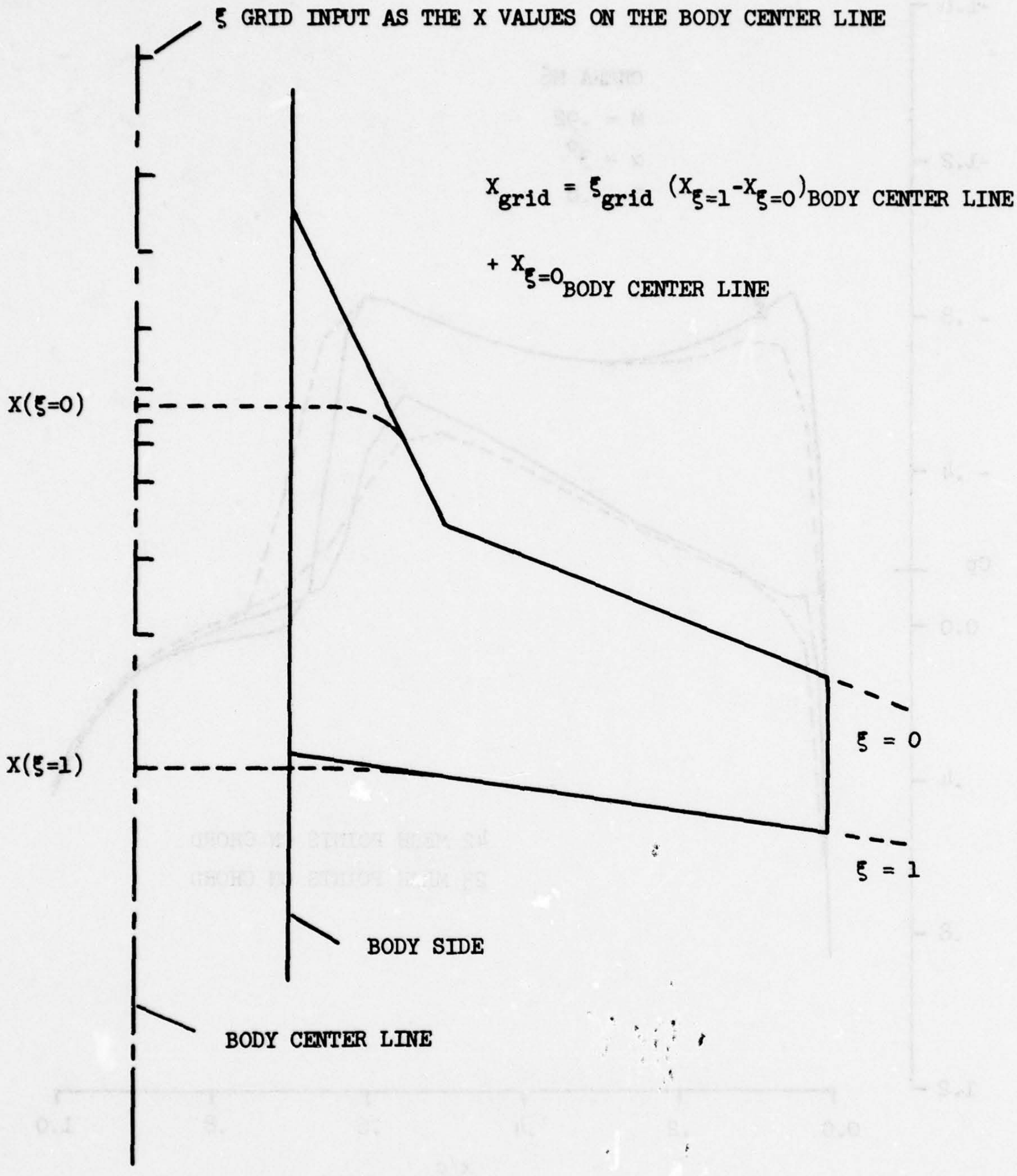


Figure 5 Mesh and Mapping Relationship

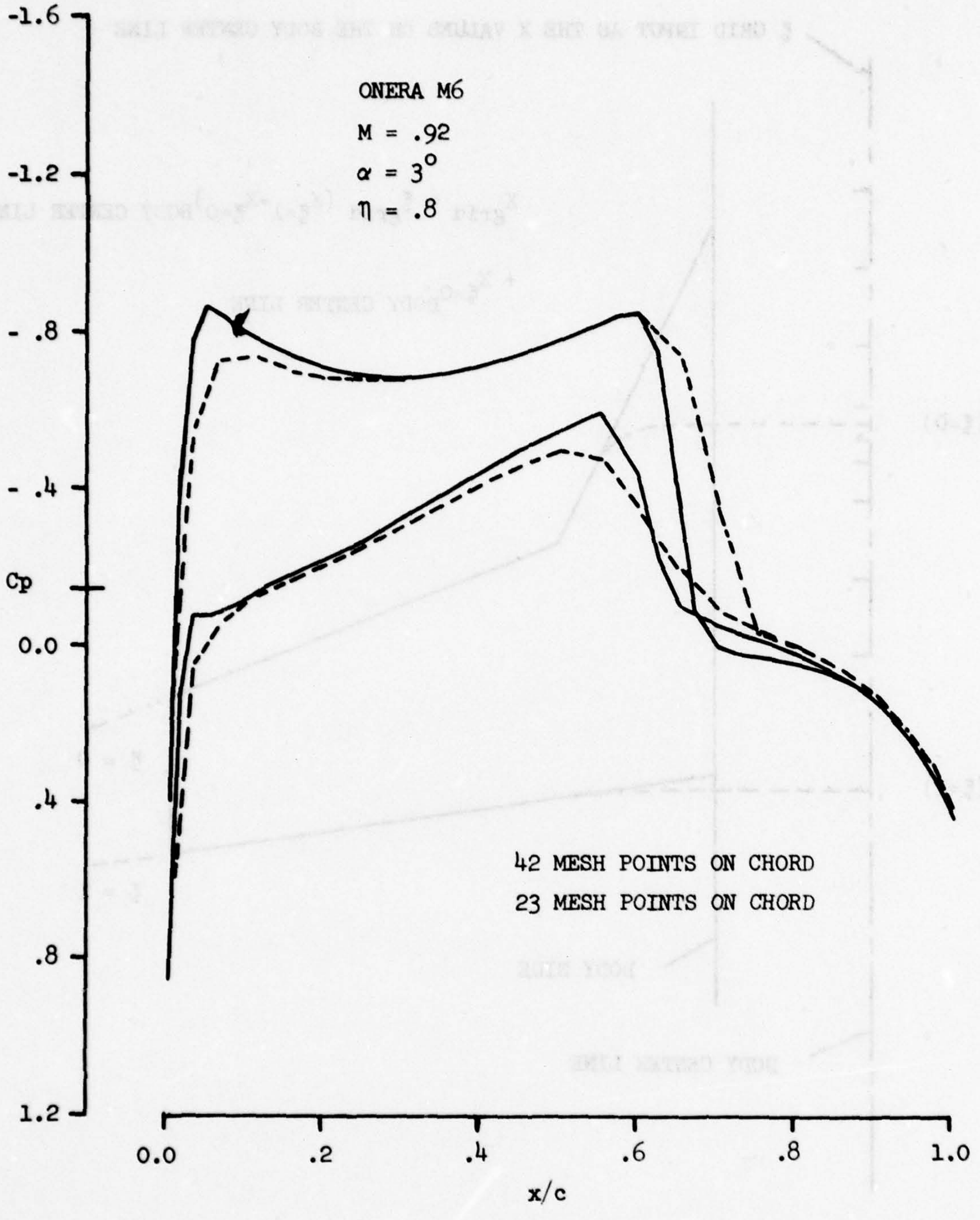


Figure 6 Solution Dependence On X Mesh Size

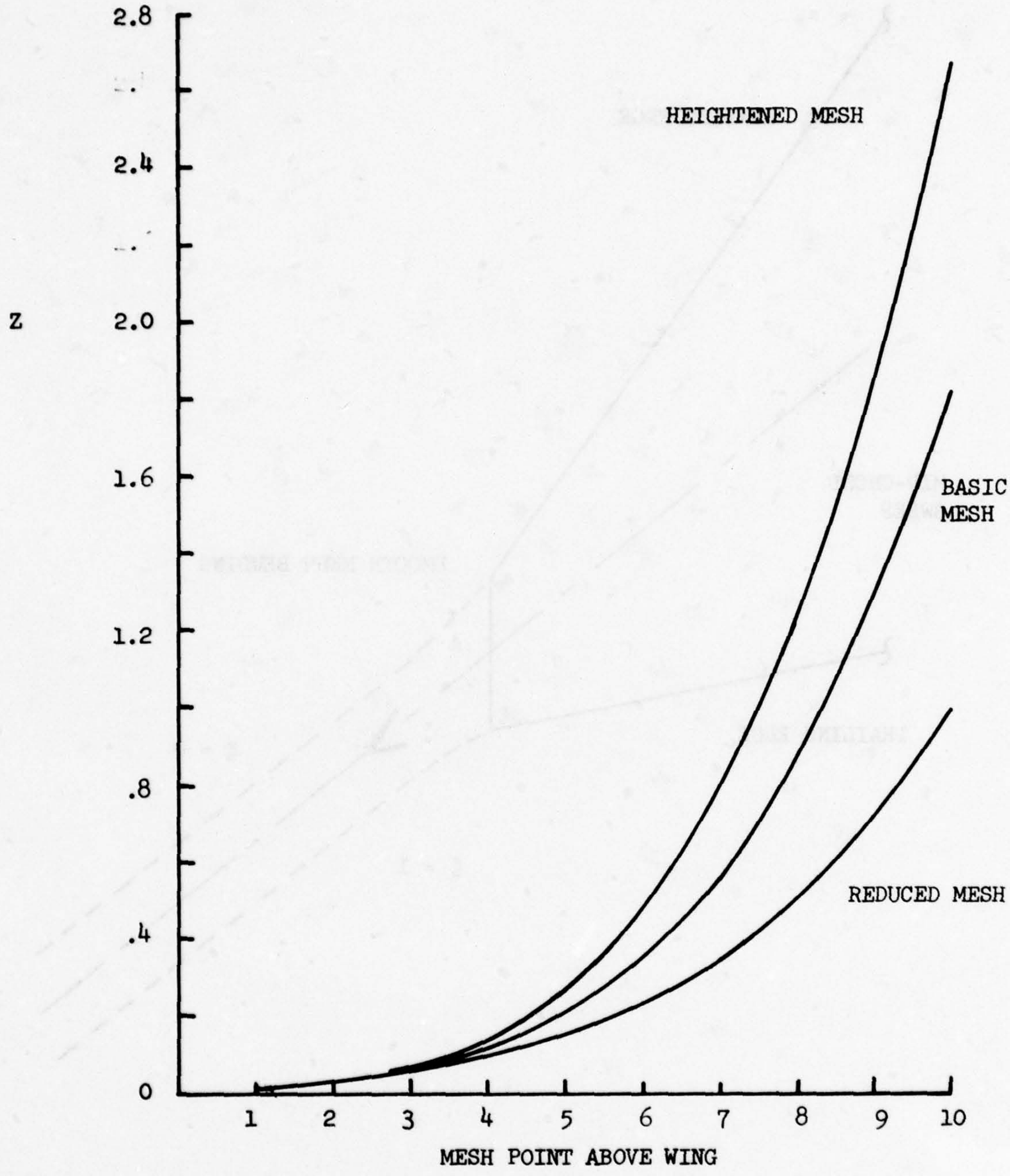
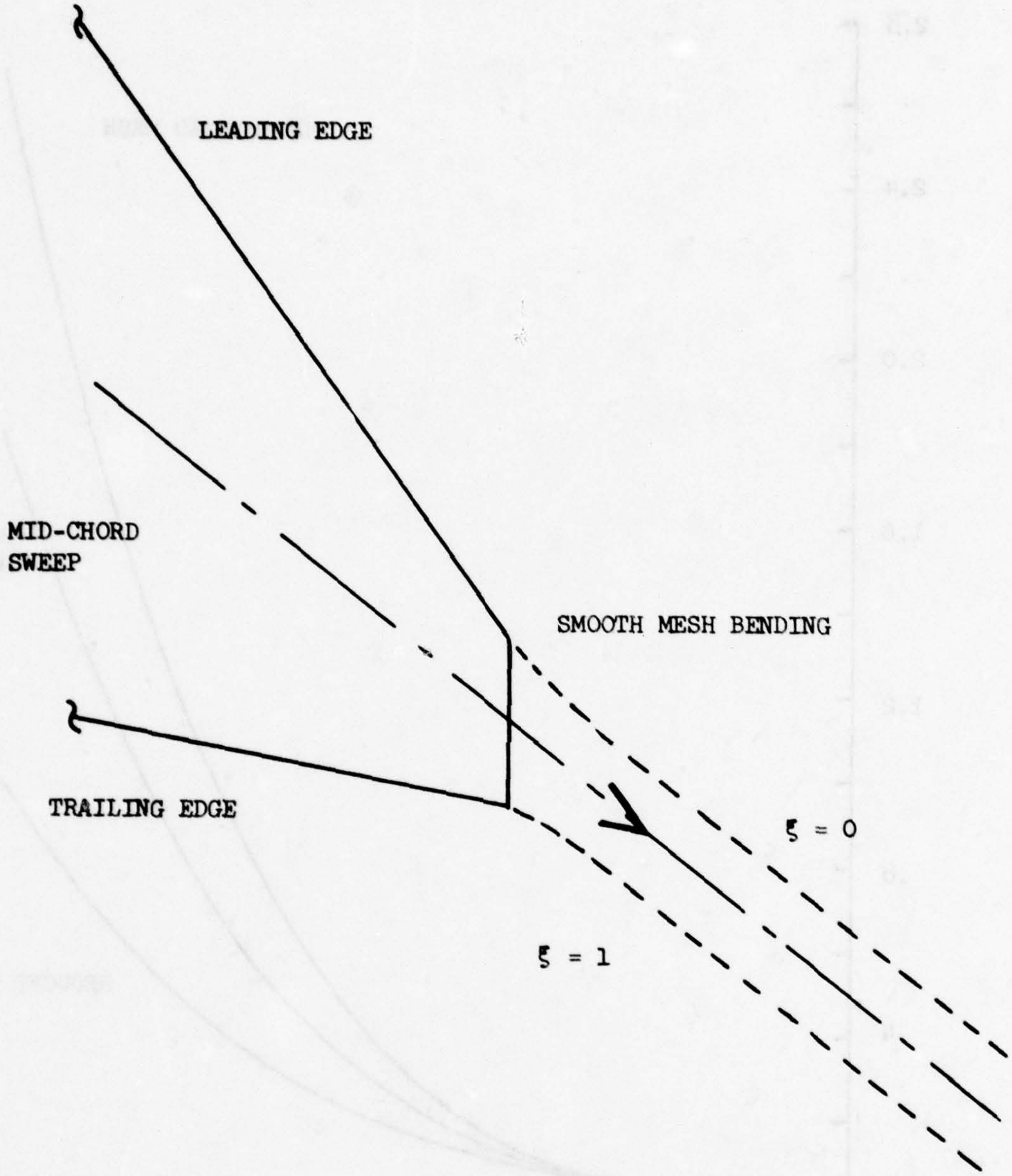
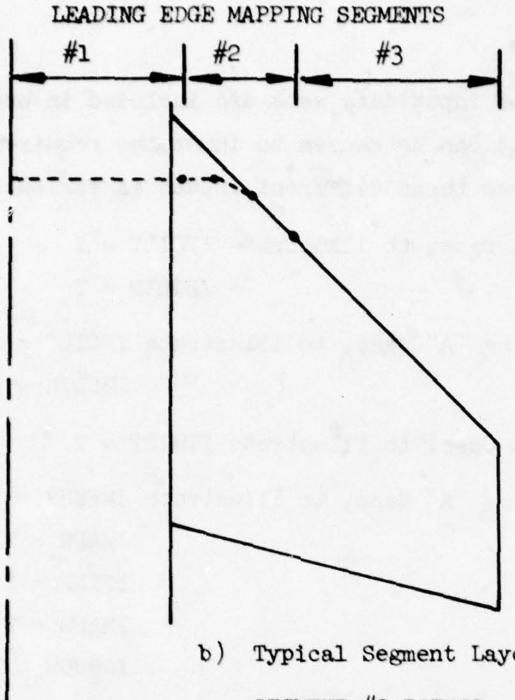


Figure 7 Z Mesh For Solution Effects Study

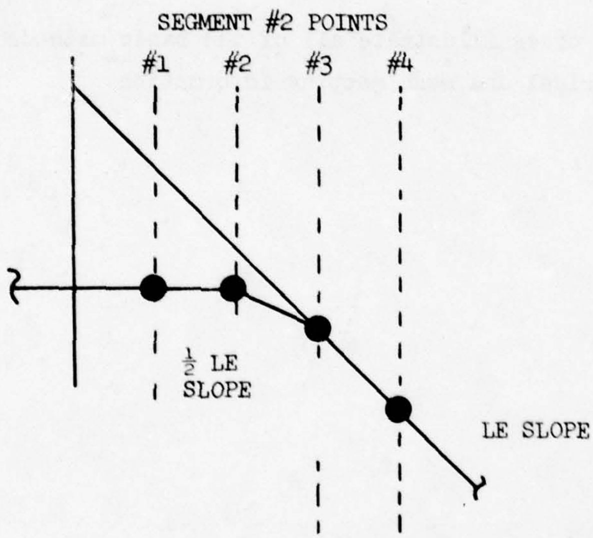


a) Bending at Tip

Figure 8 Example of Mapping Construction



b) Typical Segment Layout



c) Segment Number Two

Figure 8 Example of Mapping Construction (Concluded)

d. Example Inputs

Several examples of input data sets are included in order to illustrate the various methods that can be chosen to input the required information. Figure 9 illustrates these different inputs as follows:

Figure 9a: A55B21 Case, to illustrate IFOILT = T
IBODIN = T

Figure 9b: RAE wing "A" Case, to illustrate IFOILT = F
IBODIN = F

Figure 9c: L54H18 Case, to illustrate ITWIST = T

Figure 9d: RAE wing "A" Case, to illustrate JMESHR = T
JMAPR = T
IFINR = T
IMAPR = T
ICRUDR = T

These four cases illustrate all of the basic methods available for inputting the geometrical and mesh/mapping information.

```
NACA RM A55B21 BASIC BODY MODEL
&LIST
MACHNO=0.94,
FMAXIT=400.,
FLWRIT=1.,
XLG=0.50,
XDST=1.94,
FNF=10.,
FIVSMX=4.,
BODY=T,
ALPHAW=0.,
EPS=2.,
AXISYM=T,
IBLOUT=T,
ISAVE=T,
&END
WING PLANFORM NACA RM A55B21
0.0       4.0       7.53      8.0       10.4864   12.2464   7.60      0.0
LEADING EDGE
        2
0.0       4.0
8.0       10.4864
TRAILING EDGE
        2
0.0       7.53
8.0       12.2464
64-2A015  AIRFOIL PERPENDICULAR TO C/2  (COURTESY OF DAVE CAUGHEY)
2.0
INBOARD STATION
0.0       0.0       1.0       1.0
1.0       26.0      26.0      0.0
UPPER SURFACE
0.0       0.0
0.005542  0.010272
0.008310 0.012361
0.013843 0.015615
0.027649 0.021547
0.055148 0.029791
0.082498 0.035906
0.109701 0.040897
0.163570 0.048586
0.217063 0.054152
0.269889 0.058084
0.322159 0.060647
0.373879 0.061930
0.425060 0.061805
0.475708 0.060055
0.525834 0.057008
0.575445 0.052968
0.624547 0.048161
0.673150 0.042727
0.721261 0.036819
0.768888 0.030637
0.816036 0.024438
0.861715 0.018300
0.908931 0.012223
0.954690 0.006206
1.000     0.000249
OUTBOARD STATION
1.0       0.0       1.0       0.0
  BASIC SEARS HAACK BODY
0.0
BODY RADIUS
50.0
0.0       0.0
0.40      0.16007
0.80      0.26461
1.20      0.35237
 1.60      0.42940
2.0       0.49831
2.40      0.56058
2.80      0.61714
3.20      0.66864
3.60      0.71554
4.0       0.75819
4.20      0.7780
4.40      0.79685
4.60      0.81476
4.80      0.83176
5.0       0.84785
5.20      0.86307
5.40      0.87742
5.60      0.89093
5.8       0.9036
6.0       0.91545
6.20      0.92649
6.40      0.93673
6.60      0.94618
6.80      0.95484
7.0       0.96273
7.20       0.96985
7.40       0.97620
7.60      0.9818
7.80       0.98664
8.0       0.99073
8.2       0.99407
8.6       0.99852
9.0       1.00
9.40      0.99852
9.80       0.99407
 10.20     0.98664
 10.6      0.9762
 11.0      0.96273
 11.40     0.94618
 11.80     0.92650
 12.20      0.90361
 12.60      0.87743
 13.0      0.84786
 13.50     0.80593
 14.0      0.75820
 15.0      0.64351
 16.0      0.49832
 17.0      0.31012
 18.0      0.0
```

Figure 9a. A55B21 Case, To Illustrate IFOILT=T, IBODIN=T

```
RAE WING BODY CONFIGURATION
&LIST
ISAVE=T,
MACHNO=0.91,
IBODIN=F,
IFOILT=F,
BODY=T,
ALPHAB=1.0,
ALPHAW=1.,
FMAXIT=50.,
     FIVSMX=0.,
IVISC=T,
FLWRIT=1.,
ALPHAB=1.0
&END
RAE WING PLANFORM
0.0       -.279     .846      2.25      1.395     1.77      0.
WING LEADING EDGE
2.
0.375     0.0
2.250     1.395
WING TRAILING EDGE
2.
0.375     1.0
2.250     1.770
AIRFOIL SECTION
2.        76.       76.       0.
0.        0.        1.        0.
0.        .001      .002      .003      .004      .005      .006      .007
.0075     .008      .009      .010      .012      .0125     .014      .016
.018      .020      .025      .030      .035      .040      .05       .06
.07       .075      .08       .09       .1        .12       .14       .16
.18       .2        .22       .24       .26       .28       .3        .32
.34       .36       .38       .4        .42       .44       .45       .46
.48       .5        .52       .54       .56       .58       .6        .62
.64       .66       .68       .7        .72       .74       .76       .78
.8        .82       .84       .86       .88       .9        .92       .94
.96       .975      .9875     1.0
0.        .001      .002      .003      .004      .005      .006      .007
.0075     .008      .009      .010      .012      .0125     .014      .016
.018      .020      .025      .030      .035      .040      .05       .06
.07       .075      .08       .09       .1        .12       .14       .16
.18       .2        .22       .24       .26       .28       .3        .32
.34       .36       .38       .4        .42       .44       .45       .46
.48       .5        .52       .54       .56       .58       .6        .62
.64       .66       .68       .7        .72       .74       .76       .78
.8        .82       .84       .86       .88       .9        .92       .94
.96       .975      .9875     1.0
          F
0.        .003512   .004966   .006078   .007013   .007835   .008576   .009257
```

Figure 9b. RAE Wing "A" Case, To Illustrate IFOILT=T, IBODIN=F

```
.009578   .009888   .010480   .011039   .012074   .012318   .013022   .013901
.014721   .015494   .017257   .018832   .020262   .021577   .023934   .026008
.027863   .028722   .029540   .031067   .032466   .034938   .037046   .038847
.040380   .041674   .042746   .043610   .044271   .044730   .044972   .044960
.044752   .044376   .043855   .043205   .042438   .041565   .041091   .040595
.039539   .038403   .037196   .035924   .034592   .033209   .031779   .030308
.028803   .027267   .025707   .024126   .022531   .020926   .019317   .017707
.016097   .014487   .012878   .011268   .009658   .008049   .006439   .004829
.003219   .002012   .001006   0.
0.        -.003512  -.004966  -.006078  -.007013  -.007835  -.008576  -.009257
-.009578  -.009888  -.010480  -.011039  -.012074  -.012318  -.013022  -.013901
-.014721  -.015494  -.017257  -.018832  -.020262  -.021577  -.023934  -.026008
-.027863  -.028722  -.029540  -.031067  -.032466  -.034938  -.037046  -.038847
-.040380  -.041674  -.042746  -.043610  -.044271  -.044730  -.044972  -.044960
-.044752  -.044376  -.043855  -.043205  -.042438  -.041565  -.041091  -.040595
-.039539  -.038403  -.037196  -.035924  -.034592  -.033209  -.031779  -.030308
-.028803  -.027267  -.025707  -.024126  -.022531  -.020926  -.019317  -.017707
-.016097  -.014487  -.012878  -.011268  -.009658  -.008049  -.006439  -.004829
-.003219  -.002012  -.001006  0.
    T
INFINITE RECTANGULAR FUSELAGE
 0.20     -0.70     0.375     0.0
 3.
 -10.60   0.0       10.60
 3.
 0.0      0.20      0.375
 0.0      0.0       0.0
 0.0      0.0       0.0
 0.0      0.0       0.0
 3.
 -10.60   0.0       10.60
 3.
 0.0      0.20      0.375
 0.0      0.0       0.0
 0.0      0.0       0.0
 0.0      0.0       0.0
 3.
 -10.60   0.0       10.60
 3.
 -0.20    0.0       0.20
 0.0      0.0       0.0
 0.0      0.0       0.0
 0.0      0.0       0.0
```

Figure 9b. RAE Wing "A" Case, To Illustrate IFOILT=F, IBODIN-F
(Continued)

```
 NACA RM L54H18
 $LIST
 IFOILT=F.
 AXISYM=T.
 BODY=T.
 ITWIST=T.
 ISAVE=T.
 IDISK=T.
 MSHINT=T.
 REMESH=F.
 FMAXIT=20..
 ALPHAW=3.9.
 EPS=2..
 FNF=10..
 XDST=1.96.
 XLG=0.52.
 $END
PLANFORM GEOMETRY...SWEEP=45 DEG. ASPECT RATIO=4. TAPER RATIO=0.6
0.0        19.29      26.79      12.0       32.04      36.54      0.0        0.0
LEADING EDGE
        2.
 0.0       19.29
 12.0      32.04
TRAILING EDGE
        2.
 0.0       26.79
 12.0      36.54
NACA 65A006 AIRFOIL
        2.        26.        26.        0.
 0.0       0.0        1.0        0.0
0.0        0.005      0.0075     0.0125     0.025      0.050      0.075      0.100
0.150      0.200      0.250      0.300      0.350      0.400      0.450      0.500
0.550      0.600      0.650      0.700      0.750      0.800      0.850      0.900
0.950      1.000
0.0        0.005      0.0075     0.0125     0.025      0.050      0.075      0.100
0.150      0.200      0.250      0.300      0.350      0.400      0.450      0.500
0.550      0.600      0.650      0.700      0.750      0.800      0.850      0.900
0.950      1.000
    F
0.         0.00464    0.00563    0.00718    0.00981    0.01313    0.01591    0.01824
0.02194    0.02474    0.02687    0.02842    0.02945    0.02996    0.02992    0.02925
0.02793    0.02602    0.02364    0.02087    0.01775    0.01437    0.01083    0.00727
0.00370    0.00013
0.         -.00464    -.00563    -.00718    -.00981    -.01313    -.01591    -.01824
-.02194    -.02474    -.02687    -.02842    -.02945    -.02996    -.02992    -.02925
-.02793    -.02602    -.02364    -.02087    -.01775    -.01437    -.01083    -.00727
-.00370    -.00013
    T
   TWIST TABLE
  11.
 0.1389      0.40
 0.20       -0.480
 0.30       -1.40
 0.40       -2.08
 0.50       -2.60
 0.60       -3.04
 0.70       -3.40
 0.80       -3.70
 0.90       -4.00
 0.95       -4.06
 1.00       -4.12
CIRCULAR BODY ON RECTANGULAR BCSS
0.0
UPPER CENTER LINE
 19.0
0.0        0.0
.2         .092
.3         .119
.5         .171
1.0        .289
2.0        .482
3.0        .645
4.0        .788
6.0        1.037
8.0        1.236
10.0       1.386
12.0       1.496
14.0       1.573
16.0       1.625
18.0       1.657
20.0       1.667
28.0       1.667
39.27      1.667
40.0       1.605
```

Figure 9c. L54H18 Case, To Illustrate ITWIST=T
(Continued)

```
RAE101 WING A  MAPPING AND MESH INPUT
&LIST
BODY=T,
IFINR=T,
ICRUDR=T,
JMESHR=T,
IMAPR=T,
JMAPR=T,
IFOILT=F,
IBODIN=F,
FMXITI=2.,
FMAXIT=2.,
MACHNO=0.90,
ALPHAW=1.0,
ALPHAB=1.0,
&END
RAE101 WING A PLANFORM
9.0      -0.279     0.846     2.250     1.395     1.77      0.0
LEADING EDGE
2.0
0.0      -0.279
2.25      1.395
TRAILING EDGE
2.0
0.0       0.846
2.25      1.770
AIRFOIL SECTION
        2.        76.       76.       0.
0.       0.        1.        0.
0.       .001      .002      .003      .004      .005      .006      .007
.0075    .008      .009      .010      .012      .0125     .014      .016
.018     .020      .025      .030      .035      .040      .05       .06
.07      .075      .08       .09       .1        .12       .14       .16
.18      .2        .22       .24       .26       .28       .3        .32
.34      .36       .38       .4        .42       .44       .45       .46
.48      .5        .52       .54       .56       .58       .6        .62
.64      .66       .68       .7        .72       .74       .76       .78
.8       .82       .84       .86       .88       .9        .92       .94
.96      .975      .9875     1.0
0.       .001      .002      .003      .004      .005      .006      .007
.0075    .008      .009      .010      .012      .0125     .014      .016
.018     .020      .025      .030      .035      .040      .05       .06
.07      .075      .08       .09       .1        .12       .14       .16
.18      .2        .22       .24       .26       .28       .3        .32
.34      .36       .38       .4        .42       .44       .45       .46
.48      .5        .52       .54       .56       .58       .6        .62
.64      .66       .68       .7        .72       .74       .76       .78
.8       .82       .84       .86       .88       .9        .92       .94
.96      .975      .9875     1.0
    F
```

Figure 9d. RAE Wing "A" Case, To Illustrate JMESHR=T, JMAPR=T, IFINR=T, IMAPR=T, ICRUDR=T (Continued)

```
0.       .003512  .004966  .006078  .007013  .007835  .008576  .009257
.009578  .009888  .010480  .011039  .012074  .012318  .013022  .013901
.014721  .015494  .017257  .018832  .020262  .021577  .023934  .026008
.027863  .028722  .029540  .031067  .032466  .034938  .037046  .038847
.040380  .041674  .042746  .043610  .044271  .044730  .044972  .044960
.044752  .044376  .043855  .043205  .042438  .041565  .041091  .040595
.039539  .038403  .037196  .035924  .034592  .033209  .031779  .030308
.028803  .027267  .025707  .024126  .022531  .020926  .019317  .017707
.016097  .014487  .012878  .011268  .009658  .008049  .006439  .004829
.003219  .002012  .001006  0.
0.       -.003512 -.004966 -.006078 -.007013 -.007835 -.008576 -.009257
-.009578 -.009888 -.010480 -.011039 -.012074 -.012318 -.013022 -.013901
-.014721 -.015494 -.017257 -.018832 -.020262 -.021577 -.023934 -.026008
-.027863 -.028722 -.029540 -.031067 -.032466 -.034938 -.037046 -.038847
-.040380 -.041674 -.042746 -.043610 -.044271 -.044730 -.044972 -.044960
-.044752 -.044376 -.043855 -.043205 -.042438 -.041565 -.041091 -.040595
-.039539 -.038403 -.037196 -.035924 -.034592 -.033209 -.031779 -.030308
-.028803 -.027267 -.025707 -.024126 -.022531 -.020926 -.019317 -.017707
-.016097 -.014487 -.012878 -.011268 -.009658 -.008049 -.006439 -.004829
-.003219 -.002012 -.001006 0.
   T
INFINITE RECTANGULAR FUSELAGE
 0.20    -0.20    0.375    0.0
 3.
 -10.60  0.0      10.60
 3.
 0.0     0.20     0.375
 0.0     0.0      0.0
 0.0     0.0      0.0
 0.0     0.0      0.0
 3.
 -10.60  0.0      10.60
 3.
 0.0     0.20     0.375
 0.0     0.0      0.0
 0.0     0.0      0.0
 0.0     0.0      0.0
 3.
 -10.60  0.0      10.60
 3.
 -0.20   0.0      0.20
 0.0     0.0      0.0
 0.0     0.0      0.0
 0.0     0.0      0.0
INITIAL MESH
   24.      15.      16.      13.      9.
 -3.14097 -2.31687 -1.58349 -0.99801 -.57636  -0.3017  -0.13578 -0.03486
 0.03486  .09996   .16394   .22393   .30685   .40049   .50044   .60462
 0.71583  .84233   1.000    1.22206  1.57155  2.12944  2.93514  3.91691
 0.0      0.08291  0.14327  0.28218  0.375    0.46502  0.55235  0.72433
```

Figure 9d. RAE Wing "A" Case, To Illustrate JMESHR=T, JMAPR=T, IFINR=T, IMAPR=T, ICRUDR=T (Continued)

```
0.9902     1.33471   1.69373   2.05735    2.44265  2.88967   3.42726
-2.56      -1.54     -.81      -.405      -.2025   -.10125   -.04875   -0.015
0.015      0.04875   0.10125   0.2025     0.405    0.810     1.540     2.560
4.0
6.0        2.0
0.000      .19499    0.46502   0.19499
0.000      .00000
9.0        4.0
0.46502    0.19499   .55235    .19499   0.72433   0.25991   0.99020   0.457720
0.0        0.74402
13.0       2.0
0.0        -.279  2.25      1.39
0.744020   0.744020
15.0       5.0
2.40       1.50      2.64      1.64     2.90      1.78      3.12      1.89
3.43       2.01
0.74402    0.41068
3.0
6.0        2.0
0.00       1.10815    0.46502  1.10815
0.00       0.00
9.0        4.0
0.465020   1.108150  0.55235   1.108150  0.72433  1.14346   0.990200   1.25265
0.000      .41068
15.0       2.0
0.000      0.846     2.250     1.77000
0.41068    0.41068
FINE MESH
     54.       30.       20.       28.       11.
-.63542  -.44398  -.350     -.299     -.26775  -.24553  -.2122   -.16406
-.11221  -.05295  -.01591   0.010     0.02982  0.04947  0.07075  0.09431
0.12370  0.15357  0.18350   0.21343   0.243360 0.27330  0.30323  0.33316
0.36309  0.39302  0.422950  0.45288   0.482810 0.51274  0.54267  .57260
0.60253  0.63246  0.66239   0.69233   0.722260 0.75219  0.78212  .81205
0.84198  0.87185  0.90130   0.92941   .955370  0.97960  1.00396  1.03061
1.06159  1.09999  1.15068   1.21955   1.31378  1.44555
0.00000  0.03000  0.07500   0.14000   0.21000  .29000   0.34000  0.37500
0.40176  0.42828  0.48109   0.56983   0.65884  0.75907  0.86518  0.97392
1.08392  1.19435  1.30439   1.41356   1.52201  1.63012  1.73805  1.84558
1.95254  2.06074  2.178080  2.32192   2.51677  2.78535
-1.83669 -1.28642 -.86533   -.56095   -.35036  -.20899  -.11666  -.05903
-.02556  -.00684  .00684    .02556    .05903   .11666   .20899   .35036
.56095   .86533   1.28642   1.83669
  3.0
  9.0    2.0
0.0      0.0592   0.40176   0.0592
0.00     .0000
12.0     4.0
0.040176 0.0592   0.42828   0.0592    0.48109  0.07893  0.56983  0.144960
0.000000 0.74402
```

Figure 9d. RAE Wing "A" Case, To Illustrate JMESHR=T, JMAPR=T, IFINR=T, IMAPR=T, ICRUDR=T (Continued)

```
30.0      2.0
0.375     0.000     2.250     1.395
0.74402   0.74402
3.0
9.0       2.0
0.0       1.02462   0.40176   1.02462
0.00      0.00000
12.0      4.0
0.40176   1.02462   0.42828   1.02462   0.48109   1.04357   0.56983   1.08001
0.00000   .41068
30.0      2.0
0.375     1.0       2.25      1.77
0.41068   .41068
COARSE MESH
    30.       15.        20.        10.        11.
-10.      -7.35547  -5.07188  -3.32516  -2.08375  -1.22047  -.61813   -.20078
.08812    .30688    .50250    .69063    .86219    1.00750   1.12969   1.23938
1.34438   1.44563   1.54109   1.63594   1.75172   1.92563   2.20453   2.64406
3.30375   4.23250   5.45641   6.96875   8.71719   10.6
0.000     .170834   .3430024  .60720    .940704   1.304844  1.647324  1.942836
2.221464 2.573172  3.14670   4.154592  5.8311    8.273052  11.25
-10.      -7.55017  -5.36806 -3.62958  -2.37550  -1.53647  -.99568   -.63744
-.36685   -.12160   .12160    .36685    .63744    .99568    1.53647   2.37550
3.62958   5.36806   7.55017   10.0
```

Figure 9d. RAE Wing "A" Case, To Illustrate JMESHR=T, JMAPR=T, IFINR=T, IMAPR=T, ICRUDR=T (Concluded)

4. OUTPUT RESULTS

a. General

The output of this program contains a complete description of all of the basic elements of the inviscid numerical solution procedure. The viscous iteration output, as described below, can vary from a relatively simple overview of the viscous interaction to a completely detailed description of the boundary layer. Figure 10a shows the input echo. This section will echo all of the input parameters entered into the program via the NAMELIST. For the parameters which are not directly input, the values appearing in this section are the default values supplied by the program. The amount of output appearing in this section will vary somewhat depending on the exact run being attempted. For instance, if only an inviscid solution is being attempted, the section labeled VISCOUS ITERATION PARAMETERS will not appear. If the REMESH = T option is in effect, two sections labeled INITIAL MESH RELAXATION PARAMETERS and INITIAL MESH GENERATION PARAMETERS will appear following the flight conditions.

Following this NAMELIST echo, a section appears which echoes the wing planform input (Figure 10b). This is followed by the echo of the airfoil section input (Figure 10c). The size of this section will vary depending on the extent of the change in the airfoil ordinates over the span. The body lines, slopes, or areas appear next, depending on the input option in effect (Figure 10d). The case shown is for a body input in the form of body lines.

The following section describes the data used for the internal mesh generation. If the user were to input the mesh, this input mesh would be echoed at this point. Figure 10e shows the iteration for the mesh generation routine written by Dr. T. Holst of NASA Ames. Figures 10f and 10g complete the iteration and show the inner streamwise mesh distribution. The output shown in Figures 10e through 10g will appear only if FIOUT2 is set equal to 1 in the NAMELIST.

This section is followed by the output of the entire computational grid for the inner fine mesh (Figure 10h) including the first and second differences. These differences should always vary smoothly. If any difficulty occurs in obtaining a solution, the output should be checked to see if the problem is occurring near a mesh point where the second difference is not varying smoothly. The output illustrated in Figure 10h can provide important information for use in investigating the source of any difficulties in obtaining a solution. If the REMESH = T option is in effect, the grid shown in Figure 10h is the grid used for the REMESH solution.

If BBCPRT = T, the following section will begin the output of the body boundary condition information. Figure 10i shows the input body lines interpolated to the fine grid. Again, if REMESH = T, this grid will be the REMESH grid. This section is followed by a section showing the area distribution of the body on the fine grid or, if REMESH = T, the REMESH grid (Figure 10j). Next appears a section giving the upper and lower surface slopes (RBCU and RBCL are given at each span station on the body, see Figures 10k and 10l). Next appears the actual side wall slopes used in the calculation (see Figure 10m). Again, these body outputs will be those for the REMESH grid if REMESH = T. These numbers should, in general, also vary smoothly.

The next section will include a description of the input reference trapezoidal wing and a description of the actual input wing planform characteristics (see Figure 10n). The grid appearing depends on whether or not REMESH = T. Figure 10o shows the next section, giving the details of the XI mapping. This section also is REMESH dependent.

If WBCPRT = T, the next section will consist of the wing surface geometry at each span station (see Figure 10p). This section allows the airfoil geometry to be checked for irregularities which can cause strange pressure distributions to appear. If REMESH = T, the wing surface geometry printed will be that on the REMESH grid.

In the middle of the wing geometry output or, if WBCPRT = F following the details of the XI mapping, will appear a line giving the value of KSWICH. KSWICH is an internally calculated clue as to the type of airfoil input to the program. If KSWICH = 0, the program has determined that the foil input is a conventional foil. If KSWICH = 1, the program has determined that the foil is either supercritical or a flapped conventional foil with a relatively high flap angle. The clue is determined based on the difference between the angle of the mean camber line at the trailing edge and the average angle of the entire mean camber line. If this difference is greater than 5°, the foil is assumed to be supercritical in nature. The value of this clue governs the method of treatment of the viscous solution on the lower surface of the foil.

If REMESH = T, the next section will give the output of the inviscid iterations on the REMESH grid (see Figure 10q). This section gives the history of the inviscid solution on the REMESH grid. The REMESH option is used to provide a guess for the regular inviscid solution. This is followed by a list of the potential jump residuals across the span. Next is the error plot for

the REMESH grid, which is followed by a list of the potential jumps at the trailing edge across the span. The next section of the REMESH output gives the inviscid pressure distribution appearing at each span station, followed by the body side wall CP distribution. The last section of the REMESH output gives a summary of the forces, both local and total, calculated by the program. Also, the local X_{CP} and the total X_{CP} and Y_{CP} are calculated.

Following the REMESH output, the sections appearing in Figures 10h through 10p are repeated for the regular inviscid fine grid. Following the details of the XI mapping, the details of the body geometry on the coarse grid will appear if BBCPRT = T. This output is similar to the body geometry output previously discussed. This is followed by the crude exterior grid details (see Figure 10r). One of the most important pieces of information in this section is the summary of JLEX and JTEX. At least 4 streamwise mesh planes should cover the wing at each span station in order to obtain accurate results. Therefore, JTEX-JLEX should always be at least 3. This is followed by the airfoil surface geometry on the fine grid. The actual airfoil slopes at the grid points are given by DZU/DX and DZL/DX. The slopes, output in degrees, are given by DDZU and DDZL. As mentioned before, irregularities in the input ordinates can usually be spotted in this section.

After the airfoil surface geometry appears a section listing the parameters saved from a prior solution, if IDISK = T. The first portion of this section lists the inviscid saved solution parameters (see Figure 10s). KWRITE is an internally generated clue denoting the type of saved solution. This clue is generated in SAVSOL and inserted at the beginning of the saved solution. If KWRITE = 0, the old solution being read is an inviscid solution. If KWRITE = 1, the old solution being read is a viscous solution and, in addition to the inviscid data, the saved data includes the old deltastars, deltastar slopes and pressure distributions for both the upper and lower surface at each span station (see Figure 10t).

The next section gets into the actual solution. It consists of a summary of the residual parameters from the inviscid solution (see Figure 10u). The table presents the following information:

MESH	Alternating FINE and COARSE mesh.
ITER	Iteration number; fine and coarse iterations appear in sequential order.
ERROR	Maximum correction to potential in iteration ITER.
ERRAV	Average correction to potential in iteration ITER.
JE, KE, LE	Mesh indices of maximum correction to potential.
BIGRL	Largest residual in iteration ITER.
RSDAV	Average residual in iteration ITER.
JRD, KRD, LRD	Mesh indices of maximum residual.
NSUP	Number of supersonic points in mesh.
LIFT	Inviscid lift coefficient.
PJRSD	Maximum change in potential jump.
KPJ	Location of maximum change in potential jump.

This is followed by a table of potential jump residuals at each span station (see Figure 10v). Next, error plots for the fine and coarse mesh appear (see Figures 10w and 10x). On each plot is printed the maximum error and the maximum residual. This completes the inviscid output. The output shown in Figures 10u through 10x is repeated after each viscous iteration; or, if IVISC = F, is followed by the pressure distributions at each span station and the final force summary.

Viscous Output

If IVISC = T, a section of viscous output will appear after the coarse mesh error plot. There are 3 options available for the viscous solution in addition to the normal output. These options will be discussed following the discussion of the normal viscous output. The first section of viscous output consists of a summary of the pressure convergence history (see Figure 10y). It gives the inviscid lift calculated from the integration of $\Delta\varphi$ at the trailing edge. The pressure convergence history gives the maximum change in C_p and the average change in C_p at each span station on both the upper and lower surface. In addition, the new C_p and the old C_p at the location of the maximum change, with the location itself, are listed. For the first viscous iteration, the old C_p's will have a value of -2 at each span station as initialized by the program. If IDISK = T, the old C_p's will have the value of the C_p's from the old (saved) solution, interpolated to the new grid (if the saved solution is viscous and MSHINT = T).

This summary is followed by the viscous-inviscid interaction solution at each span station. If BODY = F, the first span station to appear in the output will be span station number 1. This is the first span station at the center line of the isolated wing. If BODY = T (i.e., the configuration includes a body), the first span station to appear will be the first span station outside the body. With most configurations, this is typically span station number 5. The first portion of this output lists the upper and lower surface C_p's and the associated local Mach numbers at each of the chordwise X/C's designated by the fine mesh (see Figure 10z).

The next portion of the viscous output (Figure 10aa) begins the boundary layer solution at the current span station. The effective sweep angle at this span station is printed. If separation is detected in the laminar solution, a statement to that effect is written and the solution proceeds as turbulent. The X/C at which laminar separation occurs is written out with the above statement. If the specified transition point is reached without laminar separation occurring, the solution switches to turbulent and no laminar boundary layer message is written. If separation is detected in the turbulent boundary layer, this is written out with the X/C at which separation occurred. At this point, the upper surface boundary layer solution halts. If separation is not detected, no message is printed. In either event, the program proceeds to a lower surface and repeats the boundary layer calculation.

Following this, a new section entitled NEW DISPLACEMENT THICKNESS AT STATION. . . appears (see Figure 10bb). This section consists of a table listing the following parameters:

J	Chordwise station index.
X/C	X/C at point J.
D-TOP	Upper surface displacement thickness (δ*).
CHANGE	Upper surface fractional change in δ* from previous iteration.
INP-SLP	Upper surface δ* slope input to program = relaxation parameter X actual δ* slope.
ACT-SLP	Actual slope of δ* on upper surface.
D-BOT	Lower surface displacement thickness (δ*).
CHANGL	Fractional change in lower surface δ* from previous iteration.
INP-SLP	Lower surface δ* input slope.
ACT-SLP	Actual lower surface δ* slope.

WBCU	Upper surface slope of equivalent inviscid airfoil.
WBCL	Lower surface slope of equivalent inviscid airfoil.

As the solution converges, INP-SLP and ACT-SLP will approach each other until, at convergence, they should be equal. The entire output of Figures 10z through 10bb is repeated for each span station.

Following the final span station, the drag estimate is presented (see Figure 10cc). This includes the total viscous drag estimate and the upper and lower surface skin frictions. Immediately below this appears a table with the following parameters:

K	Span station index.
CFFKU	Upper surface local drag estimate at span station K.
CFFKL	Lower surface local drag estimate at span station K.
MACHUP	Number of sonic points on upper surface.
SONPU	Last acceleration past sonic on upper surface.
SHKPU	Last shock on upper surface.
MACHDN	Number of sonic points on lower surface.
SONPL	Last acceleration past sonic on lower surface.
SHKPL	Last shock on lower surface.

Next, another table will appear listing the X/C's at which separation occurs on the upper and lower surface. Also listed are modified and smoothed upper surface separation points (see Figure 10dd). If the foil being analyzed is a conventional foil, this table will be followed by one listing the modified and smoothed lower surface separation points. Following this, a listing of the modified upper surface wing boundary conditions at separation appears (see Figure 10ee). If the foil is conventional, this will be followed by a table of the modified lower surface wing boundary conditions. This completes the viscous output for a single iteration.

Following the viscous output, another group of inviscid iterations appears. Then the entire group of viscous output, from Figures 10y through 10ee, is repeated. The inviscid and viscous outputs continue to alternate until the solution either converges or the maximum allowed number of viscous iterations is reached.

Final Output

Following the last viscous iteration, the program will cycle through one final group of inviscid iterations. The program will then print the pressure change summary for the nth + 1 viscous iteration. After the final pressure change summary, the program will print a statement to the effect that the solution either has or has not converged in the allowed number of viscous iterations (see Figure 10ff). This is followed by a table giving the convergence history of the viscous-inviscid interaction. The items printed in this table are:

J	Viscous iteration number.
CLGG	Calculated lift coefficient for iteration J.
ITEX	Number of inviscid iterations performed between viscous iteration (J-1) and viscous iteration J.
EPS1X	Sum of C_p changes from previous viscous iteration on upper surface.
EPS2X	Sum of C_p changes from previous viscous iteration on lower surface.
CPUK1	Upper surface C_p at selected inboard span station.
CPLK1	Lower surface C_p at selected inboard span station.
CPUK2	Upper surface C_p at selected outboard span station.
CPLK2	Lower surface C_p at selected outboard span station.
DELUK1	Upper surface δ^* at selected inboard span station.
DELLK1	Lower surface δ^* at selected inboard span station.
DELUK2	Upper surface δ^* at selected outboard span station.
DELLK2	Lower surface δ^* at selected outboard span station.

Next is a table giving the potential jump history at each span station. The convergence history is concluded by tables giving the history of the upper and lower surface separation zones and a table giving the final trailing edge potential jump (see Figure 10gg).

The next section of output (see Figure 10hh) consists of print/plots of the pressure distributions at each span station. The tables with each plot list the following parameters:

J	Index of chordwise station.
X/C	X/C at chordwise point J.
CPU	Upper surface C_p at point J.
CPL	Lower surface C_p at point J.

MU	Upper surface local Mach number.
ML	Lower surface local Mach number.
DELTA CP	CPL-CPU.
ZSONICU	Height of sonic line on upper surface.
ZSONICL	Height of sonic line on lower surface.

The following section consists of a table (see Figure 10ii) of body side wall C_p's. The final normal output section consists of the final force and moment summary (see Figure 10jj). This summary includes the spanwise force distributions and the wing total force coefficients. In addition, the local and overall center of pressures are listed. The parameters listed in the spanwise force distribution table are:

K	Index of span station.
Y	Distance from center line to span station, under consideration, on fine grid.
ETA	Fractional spanwise location of span station K.
C/CAVE	Local wing chord divided by average wing chord.
C*CN/CAVE	Local normal force span loading.
C*CA/CAVE	Local axial force span loading.
C*CL/CAVE	Local lift force span loading.
C*CD/CAVE	Local drag force span loading.
CM*(C/CAVE)^2	Local pitching moment span loading.
CN	Local normal force coefficient found from integrating the surface pressure distribution at span station K.
CA	Local axial force coefficient found from integrating the product of the surface pressure distribution and the local wing boundary condition at span station K.
CL	Local lift force coefficient found from CN and CA.
CD	Local drag force coefficient found from CN and CA.
CM	Local pitching moment coefficient found from integration of $\Delta C_p \cdot X$ where X is distance from X moment reference to chordwise point J.
XCP/C	Local spanwise center of pressure as fraction of local chord calculated from: XCP/C = XMOM - CM/CL*C

This completes the spanwise force coefficients table. The next portion of the final output section gives the total force coefficients for the wing-body configuration. The parameters given in the total force coefficients are:

SREF	Area of reference trapezoidal wing.
AR REF	Aspect ratio of reference trapezoidal wing.
STRUE	Area of actual wing.
ARTRUE	Aspect ratio of actual wing.
SEXPOSED	Area of exposed wing.
CN	Total normal force coefficient based on SREF.
CA	Total axial force coefficient based on SREF.
CM	Total pitching moment coefficient about XMOM.
CL	Total lift coefficient calculated both by surface pressure integration and by circulation.
CD	Total inviscid drag coefficient.
XCP	X location, in fine grid, of center of pressure calculated from: $XCP = XMOM - CM_{(total)}/CL_{(total)}*CAV$
YCP	Y location on wing of center of pressure calculated from: $YCP = \frac{\Sigma(\Delta CP \cdot Y)}{\Sigma \Delta CP}$
CDF (Upper)	Upper surface viscous skin friction.
CDF (Lower)	Lower surface viscous skin friction.
CDF (Total)	Total viscous skin friction.
CD(P+I)	Total drag coefficient.
CB	Unswept root bending-moment.

This concludes the normal output of the program. However, if ISAVE = T, a group of tables (see Figure 10kk) will appear giving the values of the viscous parameters that are saved for a future restart. These parameters, displacement thickness, displacement thickness slope, and pressure coefficient appear for each span station and both the upper and lower surface.

<u>Output Options</u>

There are 3 output options available to the user. The first of these is generally the most used. By setting FLWRIT = 1, the amount of output generated is decreased by a factor of about 3. This option, and also the other two, is useful only on viscous solutions. The change in output occurs only in the viscous portion of the solution. The sections of output illustrated in

Figures 10z, 10bb, 10cc and 10ee are eliminated and the section illustrated by Figure 10aa becomes that shown in Figure 10ll. After the final viscous iteration a summary of the boundary layer information from the final viscous iteration is printed for each span station (Figure 10mm).

The other 2 options should be used very judiciously as they increase the amount of output tremendously. The first option is selected by setting FIOUTP = 1. With this option, a detailed description of the boundary layer is printed for each span station. This option increases the viscous output by a factor of 5 over the normal viscous output. The primary use of this option is in troubleshooting the solution in case of problems.

The second of the 2 options is invoked by setting FIOUTP = 2. This option causes all of the output of the previous option to be printed with the addition of a complete set of boundary layer profiles at each point on the wing. This increases the amount of output by a factor of 5 over that with FIOUTP = 1 and leads to a truly prodigious amount of output. It is highly recommended that this output option not be utilized unless absolutely necessary.

```
GRUMMAN AMES TRANSONIC VISCOUS WING BODY ANALYSIS PROGRAM

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     NASA AMES RESEARCH CENTER                    MARK A. STERN
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PROGRAM DEVELOPED FOR THE AIR FORCE FLIGHT DYNAMICS LAB, WPAFB, DAYTON OHIO

INPUT DATA

TACT

IDISK    MSHINT   ISAVE    IPLOT    SOLV     WBCPRT   BBCPRT   BODY     FCR      ISPAN    EXTMSH   REMESH
 T        F        F        T        T        T        T        T        T        T        T        F

YA*      IFINR    ICRUDR   IMAPR    IBUMP    IVISC    ITWIST   IFOILT   IBODIN   AXISYM   AREA     IBLOUT
 F        F        F        F        F        T        F        F        T        F        F        F

JMESHR   JMAPR
 F        F

FLIGHT CONDITIONS

MACHNO   ALPHAW   ALPHAB   GAMMA    RFACT    EMEXP(1)  EMEXP(2)
 .9000   5.2000   5.2000   1.4000   0.0000   1.7500    -.2500

FINE MESH RELAXATION PARAMETERS

FMAXIT   FINCR    RSUR     RTEST     EPS
  45.       1.    1.700    .100E-04  2.00

FINE MESH GENERATION PARAMETERS

DXL      DXT      DXMX     FNF      FNB      XDST     XLG      FIOUT1   FIOUT2
.0080    .0200    .0300     8.       8.      1.88      .44      0.       0.

COARSE MESH RELAXATION PARAMETERS

FMXITN   FMXITX   FINCRX   RSUBX    EPSEX
  1.       1.       1.     1.600    1.00

VISCOUS ITERATION PARAMETERS

FIVSMX   FIVCON   EPSVIS   RE       FIOUTP   FISTEP   FITRNS   XTRNT    XTRNB    CHISWP
  1.       2.     .0100    10,000     0.      10.      -4.      .050     .050     .500

FKSMTX   FK2SMT   FKENDS   FLWRIT   RELBL    EXTNDU   EXTNDL   FKI      FKO
  0.       0.       0.       1.     .600     .970     1.000     0.       0.
```

FIGURE 10a ECHO OF INPUT OPTION AND FLIGHT CONDITION PARAMETERS

```
TACT PLANFORM

YROOT       XLER        XTER        YTIP        XLET        XTET        XMOM        SREF
0.00000   405.37020   571.07000   331.99300   567.29400   658.29000    0.00000     0.0000

LEADING EDGE

XNLE
  3.

N   YLEI(N)      XLEI(N)
 1     0.0000     267.0560
 2    98.3970     453.3620
 3   331.9930     567.2940

TRAILING EDGE

XNTE
  2.

N   YTEI(N)      XTEI(N)
 1     0.0000     571.0700
 2   331.9930     658.2900
```

FIGURE 10b SAMPLE WING PLANFORM INPUT

```
AIRFOIL SECTION INPUT

 TACT 1 WING AIRFOIL SECTION

XNPAN    FNU      FNL       XKBMTH
 5.      38.      38.        0.

N       YP(N)     THETP(N)
1     0.000000   0.000000
2      .500000   0.000000
3     1.000000  -0.000000

X/C AT WHICH UPPER SURFACE ORDINATES ARE INPUT
0.000000  .001038  .002076  .003113  .004151  .005189  .007782  .012968
 .025924  .051798  .077624  .103400  .154808  .206022  .257044  .307874
 .358515  .408966  .459229  .509305  .559195  .608900  .633683  .658420
 .683112  .707758  .732359  .756914  .781424  .805889  .830309  .854684
 .879015  .903300  .927542  .951739  .975891 1.000000

X/C AT WHICH LOWER SURFACE ORDINATES ARE INPUT
0.000000  .001038  .002076  .003113  .004151  .005189  .007782  .012968
 .025924  .051798  .077624  .103400  .154808  .206022  .257044  .307874
 .358515  .408966  .459229  .509305  .559195  .608900  .633683  .658420
 .683112  .707758  .732359  .756914  .781424  .805889  .830309  .854684
 .879015  .903300  .927542  .951739  .975891 1.000000

Y(N) =0.000000   ISAME IS FALSE

THE FOLLOWING ZU/C ARE INPUT
 .013223  .020405  .023266  .025334  .026983  .028358  .031072  .035052
 .041610  .049382  .054837  .058868  .064603  .068655  .071655  .073967
 .075719  .076855  .077477  .077696  .077528  .076942  .076494  .075905
 .075131  .074129  .072895  .071471  .069852  .067842  .065386  .062446
 .059066  .055075  .050735  .045818  .040656  .034989

THE FOLLOWING ZL/C ARE INPUT
 .013223  .006038  .003134  .000983 -.000737 -.002176 -.004970 -.008688
-.014408 -.021350 -.025513 -.028167 -.030523 -.031375 -.030976 -.029730
-.028019 -.025699 -.022611 -.018599 -.013514 -.006429 -.001821  .003280
 .008537  .013705  .018602  .023169  .027290  .030936  .033990  .036386
 .037981  .038698  .038326  .036558  .033292  .027993

Y(N) = .500000   ISAME IS FALSE
```

FIGURE 10c SAMPLE AIRFOIL SECTION INPUT

```
TACT BODY INPUT BASED ON AREA DISTRIBUTION

WING WATERLINE IS    0,0000

UPPER CENTER LINE

    25,0      COORD PAIRS DEFINE LINE

   0,00000 -42,00000
  43,64000 -29,27000
  87,27000 -21,03000
 130,91000 -16,18000
 174,55000 -12,41000
 218,18000  -7,52000
 261,82000  -2,64000
 305,45000   -,37000
 349,09000   1,37000
 392,73000   3,32000
 425,45000   4,92000
 436,36000   6,10000
 458,18000   7,50000
 480,00000   6,40000
 523,64000   4,81000
 567,27000   3,44000
 610,91000   1,70000
 654,55000  -1,15000
 698,18000  -3,33000
 741,82000  -6,49000
 763,64000  -8,85000
 785,46000 -26,35000
 829,09000 -28,85000
 850,91000 -30,30000
 861,82000 -42,00000

LOWER CENTER LINE

    25,0      COORD PAIRS DEFINE LINE

   0,00000 -42,00000
  43,64000 -58,73000
  87,27000 -62,97000
 130,91000 -67,82000
 174,55000 -71,59000
 218,18000 -76,48000
 261,82000 -81,36000
 305,45000 -83,63000
 349,09000 -85,37000
 392,73000 -87,32000
 425,45000 -88,92000
 436,36000 -90,10000
 458,18000 -91,50000
 480,00000 -90,40000
```

FIGURE 10d SAMPLE BODY INPUT

```
*****************************************************************************************************************

                    X-DIRECTION GRID DISTRIBUTION

*****************************************************************************************************************

          ***** STRETCHING FUNCTION COEFFICIENTS *****

INNER
ITER        A               B               C               D               Z2
 NO
   1   .20000000E+01   .13953488E+00   .76744186E-01   .19545455E+00   .45000000E+00
   2   .20000000E+01   .11318087E+00   .62249478E-01   .24096587E+00   .41222591E+00
   3   .20000000E+01   .10592257E+00   .58257415E-01   .25747796E+00   .40182235E+00
   4   .20000000E+01   .10392353E+00   .57157939E-01   .26243074E+00   .39895705E+00
   5   .20000000E+01   .10337296E+00   .56855127E-01   .26382845E+00   .39816791E+00
   6   .20000000E+01   .10322132E+00   .56771728E-01   .26421602E+00   .39795056E+00
   7   .20000000E+01   .10317956E+00   .56748758E-01   .26432296E+00   .39789070E+00
   8   .20000000E+01   .10316806E+00   .56742432E-01   .26435243E+00   .39787422E+00
   9   .20000000E+01   .10316489E+00   .56740690E-01   .26436055E+00   .39786968E+00
  10   .20000000E+01   .10316402E+00   .56740210E-01   .26436279E+00   .39786843E+00
  11   .20000000E+01   .10316378E+00   .56740078E-01   .26436340E+00   .39786808E+00
  12   .20000000E+01   .10316371E+00   .56740041E-01   .26436357E+00   .39786799E+00

OUTER ITER NO =  1   XN = 0.                 XNP =  .713051150E-01   FUNX =  .567400413E-01   FUNXX = -.795735921E+00

   1   .20000000E+01   .10712390E+00   .60134492E-01   .24944087E+00   .39786796E+00
   2   .20000000E+01   .10518260E+00   .59031650E-01   .25410098E+00   .39524937E+00
   3   .20000000E+01   .10470400E+00   .58759761E-01   .25527674E+00   .39460380E+00
   4   .20000000E+01   .10458601E+00   .58692731E-01   .25556827E+00   .39444464E+00
   5   .20000000E+01   .10455692E+00   .58676206E-01   .25564025E+00   .39440540E+00
   6   .20000000E+01   .10454975E+00   .58672132E-01   .25565800E+00   .39439573E+00
   7   .20000000E+01   .10454798E+00   .58671127E-01   .25566238E+00   .39439334E+00
   8   .20000000E+01   .10454755E+00   .58670880E-01   .25566346E+00   .39439275E+00
   9   .20000000E+01   .10454744E+00   .58670819E-01   .25566372E+00   .39439261E+00

OUTER ITER NO =  2   XN =  .713051150E-01   XNP =  .720649287E-01   FUNX =  .622775981E-03   FUNXX = -.819643006E+00

   1   .20000000E+01   .10454789E+00   .58671211E-01   .25566202E+00   .39439257E+00
   2   .20000000E+01   .10454765E+00   .58671075E-01   .25566261E+00   .39439225E+00
   3   .20000000E+01   .10454759E+00   .58671041E-01   .25566275E+00   .39439217E+00

OUTER ITER NO =  3   XN =  .720649287E-01   XNP =  .720654135E-01   FUNX =  .397197844E-06   FUNXX = -.819326865E+00

   1   .20000000E+01   .10454758E+00   .58671033E-01   .25566279E+00   .39439215E+00

OUTER ITER NO =  4   XN =  .720654135E-01   XNP =  .720654048E-01   FUNX = -.709370993E-08   FUNXX = -.819326637E+00
```

FIGURE 10e SAMPLE MESH GENERATION OUTPUT

***** AIRFOIL ITERATION *****

ITER	ELE	ETE	DMAX
1	.500000E-03	.250000E-03	.508901E-01
2	.250000E-03	.250000E-03	.427028E-01
3	.250000E-03	.125000E-03	.335724E-01
4	.250000E-03	.625000E-04	.330983E-01
5	.125000E-03	.625000E-04	.295277E-01
6	.187500E-03	.937500E-04	.314494E-01
7	.187500E-03	.781250E-04	.304322E-01
8	.187500E-03	.703125E-04	.299872E-01
9	.218750E-03	.742188E-04	.310369E-01
10	.203125E-03	.742188E-04	.302198E-01
11	.203125E-03	.722656E-04	.301008E-01
12	.203125E-03	.712891E-04	.300415E-01
13	.203125E-03	.708008E-04	.300119E-01
14	.203125E-03	.705566E-04	.299971E-01
15	.210938E-03	.706787E-04	.304443E-01
16	.207031E-03	.706787E-04	.301494E-01
17	.205078E-03	.706787E-04	.300350E-01
18	.204102E-03	.706787E-04	.300028E-01
19	.204102E-03	.706177E-04	.299991E-01
20	.204590E-03	.706482E-04	.300061E-01

***** AFT OF TE ITERATION *****

ITER	E2	X(NI)
1	.500000E-02	.312840E+01
2	.250000E-02	.190301E+01
3	.125000E-02	.154271E+01

***** FORWARD OF LE ITERATION *****

ITER	E1	X(1)
1	.500000E-02	-.140240E+01
2	.250000E-02	-.522879E+00
3	.375000E-02	-.724741E+00

FIGURE 10f SAMPLE AIRFOIL MESH GENERATION OUTPUT

***** X-DIRECTION GRID DISTRIBUTION *****

I	X	DX
1	-.723892E+00	0.
2	-.489516E+00	.234376E+00
3	-.283806E+00	.205710E+00
4	-.104718E+00	.179087E+00
5	-.539447E-01	.507738E-01
6	-.332734E-01	.206713E-01
7	-.212314E-01	.120419E-01
8	-.121458E-01	.908561E-02
9	-.399531E-02	.815051E-02
10	.399531E-02	.799062E-02
11	.119982E-01	.800291E-02
12	.200755E-01	.807723E-02
13	.283367E-01	.826122E-02
14	.369394E-01	.860274E-02
15	.460929E-01	.915345E-02
16	.560655E-01	.997268E-02
17	.671966E-01	.111311E-01
18	.799064E-01	.127098E-01
19	.946942E-01	.147877E-01
20	.112099E+00	.174048E-01
21	.132590E+00	.204906E-01
22	.156363E+00	.237737E-01
23	.183121E+00	.267573E-01
24	.212012E+00	.288917E-01
25	.241918E+00	.299058E-01
26	.271889E+00	.299709E-01
27	.301398E+00	.295092E-01
28	.330305E+00	.289065E-01
29	.358694E+00	.283890E-01
30	.386740E+00	.280461E-01
31	.414627E+00	.278874E-01
32	.442514E+00	.278867E-01
33	.470520E+00	.280060E-01
34	.498728E+00	.282084E-01
35	.527192E+00	.284643E-01
36	.555944E+00	.287515E-01
37	.584991E+00	.290474E-01
38	.614325E+00	.293335E-01
39	.643919E+00	.295943E-01
40	.673730E+00	.298108E-01
41	.703682E+00	.299518E-01
42	.733647E+00	.299649E-01
43	.763417E+00	.297707E-01
44	.792688E+00	.292703E-01
45	.821062E+00	.283747E-01
46	.848121E+00	.270591E-01
47	.873538E+00	.254170E-01
48	.897203E+00	.236649E-01

FIGURE 10g SAMPLE GRID DISTRIBUTION

COMPUTATIONAL GRID

N	XT	ETA	ZT	DX	DY	DZ	D2X	D2Y	D2Z
1	-.72389	0.00000	-304.34082	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2	-.48952	12.07247	-213.15954	.2200	12.0725	80.4779	-.0287	0.0000	-21.4068
3	-.28381	24.14495	-143.38501	.1924	12.0725	60.1051	-.0266	0.0000	-19.3388
4	-.10472	36.21742	-92.94930	.1149	12.0725	42.6652	-.1283	0.0000	-15.5410
5	-.05394	48.28989	-58.05458	.0357	12.0725	29.1599	-.0301	0.0000	-11.4697
6	-.03327	60.36236	-34.62960	.0164	12.0725	19.3620	-.0086	0.0000	-8.1259
7	-.02123	72.43484	-19.33054	.0106	12.0725	12.4242	-.0030	0.0000	-5.7498
8	-.01215	84.50731	-9.78126	.0086	12.0725	7.5476	-.0009	0.0000	-4.0033
9	-.00400	96.57978	-4.23529	.0081	12.0725	4.3239	-.0002	0.0000	-2.4441
10	.00400	108.65225	-1.13339	.0080	12.0725	2.6843	.0000	0.0000	-.8351
11	.01200	120.72473	1.13339	.0080	12.0725	2.6843	.0001	0.0000	.8351
12	.02008	132.79720	4.23529	.0082	12.0725	4.3239	.0002	0.0000	2.4441
13	.02834	144.86967	9.78126	.0084	12.0725	7.5476	.0003	0.0000	4.0033
14	.03694	156.94215	19.33054	.0089	12.0725	12.4242	.0006	0.0000	5.7498
15	.04609	169.01462	34.62960	.0096	12.0725	19.3620	.0008	0.0000	8.1259
16	.05607	181.08709	58.05458	.0106	12.0725	29.1599	.0012	0.0000	11.4697
17	.06720	193.15956	92.94930	.0119	12.0725	42.6652	.0016	0.0000	15.5410
18	.07991	205.23204	143.38501	.0137	12.0725	60.1051	.0021	0.0000	19.3388
19	.09469	217.30451	213.15954	.0161	12.0725	80.4779	.0026	0.0000	21.4068
20	.11210	229.37698	304.34082	.0189	12.0725	0.0000	.0031	0.0000	0.0000
21	.13259	241.44945	0.00000	.0221	12.0725	0.0000	.0033	0.0000	0.0000
22	.15636	253.52193	0.00000	.0253	12.0725	0.0000	.0030	0.0000	0.0000
23	.18312	265.59440	0.00000	.0278	12.0725	0.0000	.0021	-.0000	0.0000
24	.21201	277.66687	0.00000	.0294	12.0725	0.0000	.0010	0.0000	0.0000
25	.24192	289.73935	0.00000	.0299	12.0725	0.0000	.0001	-.0000	0.0000
26	.27189	301.81182	0.00000	.0297	12.0725	0.0000	-.0005	0.0000	0.0000
27	.30140	313.88429	0.00000	.0292	12.0725	0.0000	-.0006	-.0000	0.0000
28	.33030	325.95676	0.00000	.0286	12.0725	0.0000	-.0005	0.0000	0.0000
29	.35869	338.02924	0.00000	.0282	12.0725	0.0000	-.0003	-.0000	0.0000
30	.38674	350.10171	0.00000	.0280	0.0000	0.0000	-.0002	0.0000	0.0000
31	.41463	0.00000	0.00000	.0279	0.0000	0.0000	-.0000	0.0000	0.0000
32	.44251	0.00000	0.00000	.0279	0.0000	0.0000	.0001	0.0000	0.0000
33	.47052	0.00000	0.00000	.0281	0.0000	0.0000	.0002	0.0000	0.0000
34	.49873	0.00000	0.00000	.0283	0.0000	0.0000	.0003	0.0000	0.0000
35	.52719	0.00000	0.00000	.0286	0.0000	0.0000	.0003	0.0000	0.0000
36	.55594	0.00000	0.00000	.0289	0.0000	0.0000	.0003	0.0000	0.0000
37	.58499	0.00000	0.00000	.0292	0.0000	0.0000	.0003	0.0000	0.0000
38	.61432	0.00000	0.00000	.0295	0.0000	0.0000	.0003	0.0000	0.0000
39	.64392	0.00000	0.00000	.0297	0.0000	0.0000	.0002	0.0000	0.0000
40	.67373	0.00000	0.00000	.0299	0.0000	0.0000	.0001	0.0000	0.0000
41	.70368	0.00000	0.00000	.0300	0.0000	0.0000	.0000	0.0000	0.0000
42	.73365	0.00000	0.00000	.0299	0.0000	0.0000	-.0002	0.0000	0.0000
43	.76342	0.00000	0.00000	.0295	0.0000	0.0000	-.0005	0.0000	0.0000
44	.79269	0.00000	0.00000	.0288	0.0000	0.0000	-.0009	0.0000	0.0000
45	.82106	0.00000	0.00000	.0277	0.0000	0.0000	-.0013	0.0000	0.0000
46	.84812	0.00000	0.00000	.0262	0.0000	0.0000	-.0016	0.0000	0.0000
47	.87354	0.00000	0.00000	.0245	0.0000	0.0000	-.0018	0.0000	0.0000
48	.89720	0.00000	0.00000	.0229	0.0000	0.0000	-.0016	0.0000	0.0000
49	.91928	0.00000	0.00000	.0215	0.0000	0.0000	-.0012	0.0000	0.0000
50	.94014	0.00000	0.00000	.0205	0.0000	0.0000	-.0007	0.0000	0.0000
51	.96028	0.00000	0.00000	.0200	0.0000	0.0000	-.0003	0.0000	0.0000
52	.98015	0.00000	0.00000	.0199	0.0000	0.0000	-.0000	0.0000	0.0000

FIGURE 10h SAMPLE COMPUTATIONAL GRID FOR INNER FINE MESH

BODY LINES INTERPOLATED TO FINE GRID

J	XIN,	ZUCLI	ZUCLIP	ZLCLI	ZLCLIP	ZMHBI	ZMHBIP	YMHBI	YMHBIP
1	-.11065	-.12300	0.00000	-.12300	0.00000	-.12300	0.00000	0.00000	0.00000
2	.02439	-.10412	.77400	-.14188	-.77400	-.12300	0.00000	.01888	.77400
3	.14115	-.03026	.24400	-.21574	-.24400	-.12300	0.00000	.09274	.24400
4	.24150	-.00868	.18600	-.23732	-.18600	-.12300	0.00000	.11432	.18600
5	.32746	.00131	.10600	-.24731	-.10600	-.12300	0.00000	.12431	.10600
6	.40139	.00424	-.04000	-.25024	.04000	-.12300	0.00000	.12724	-.04000
7	.46609	.00172	-.03600	-.24772	.03600	-.12300	0.00000	.12472	-.03600
8	.52471	-.00034	-.03400	-.24566	.03400	-.12300	0.00000	.12266	-.03400
9	.55733	-.00149	-.04000	-.24451	.04000	-.12300	0.00000	.12151	-.04000
10	.57208	-.00208	-.04000	-.24392	.04000	-.12300	0.00000	.12092	-.04000
11	.58000	-.00240	-.04000	-.24360	.04000	-.12300	0.00000	.12060	-.04000
12	.58518	-.00261	-.04000	-.24339	.04000	-.12300	0.00000	.12039	-.04000
13	.58916	-.00277	-.04000	-.24323	.04000	-.12300	0.00000	.12023	-.04000
14	.59264	-.00291	-.04000	-.24309	.04000	-.12300	0.00000	.12009	-.04000
15	.59593	-.00304	-.04000	-.24296	.04000	-.12300	0.00000	.11996	-.04000
16	.59920	-.00317	-.04000	-.24283	.04000	-.12300	0.00000	.11983	-.04000
17	.60247	-.00328	-.03400	-.24272	.03400	-.12300	0.00000	.11972	-.03400
18	.60577	-.00340	-.03400	-.24260	.03400	-.12300	0.00000	.11960	-.03400
19	.60914	-.00351	-.03400	-.24249	.03400	-.12300	0.00000	.11949	-.03400
20	.61266	-.00363	-.03400	-.24237	.03400	-.12300	0.00000	.11937	-.03400
21	.61640	-.00376	-.03400	-.24224	.03400	-.12300	0.00000	.11924	-.03400
22	.62047	-.00390	-.03400	-.24210	.03400	-.12300	0.00000	.11910	-.03400
23	.62502	-.00405	-.03400	-.24195	.03400	-.12300	0.00000	.11895	-.03400
24	.63021	-.00423	-.03400	-.24177	.03400	-.12300	0.00000	.11877	-.03400
25	.63626	-.00443	-.03400	-.24157	.03400	-.12300	0.00000	.11857	-.03400
26	.64337	-.00467	-.03400	-.24133	.03400	-.12300	0.00000	.11833	-.03400
27	.65174	-.00487	.01600	-.24113	-.01600	-.12300	0.00000	.11813	.01600
28	.66145	-.00472	.01600	-.24128	-.01600	-.12300	0.00000	.11828	.01600
29	.67239	-.00454	.01600	-.24146	-.01600	-.12300	0.00000	.11846	.01600
30	.68419	-.00435	.01600	-.24165	-.01600	-.12300	0.00000	.11865	.01600
31	.69641	-.00416	.01600	-.24184	-.01600	-.12300	0.00000	.11884	.01600
32	.70866	-.00353	.06600	-.24247	-.06600	-.12300	0.00000	.11947	.06600
33	.72071	-.00273	.06600	-.24327	-.06600	-.12300	0.00000	.12027	.06600
34	.73253	-.00195	.06600	-.24405	-.06600	-.12300	0.00000	.12105	.06600
35	.74412	-.00119	.06600	-.24481	-.06600	-.12300	0.00000	.12181	.06600
36	.75558	-.00044	.06400	-.24556	-.06400	-.12300	0.00000	.12256	.06400
37	.76698	.00029	.06400	-.24629	-.06400	-.12300	0.00000	.12329	.06400
38	.77837	.00102	.06400	-.24702	-.06400	-.12300	0.00000	.12402	.06400
39	.78982	.00175	.06400	-.24775	-.06400	-.12300	0.00000	.12475	.06400
40	.80134	.00244	.03000	-.24844	-.03000	-.12300	0.00000	.12544	.03000
41	.81297	.00279	.03000	-.24879	-.03000	-.12300	0.00000	.12579	.03000
42	.82472	.00314	.03000	-.24914	-.03000	-.12300	0.00000	.12614	.03000
43	.83659	.00350	.03000	-.24950	-.03000	-.12300	0.00000	.12650	.03000
44	.84857	.00386	.03000	-.24986	-.03000	-.12300	0.00000	.12686	.03000
45	.86067	.00399	.00800	-.24999	-.00800	-.12300	0.00000	.12699	.00800
46	.87285	.00408	.00800	-.25008	-.00800	-.12300	0.00000	.12708	.00800
47	.88509	.00418	.00800	-.25018	-.00800	-.12300	0.00000	.12718	.00800
48	.89733	.00428	.00800	-.25028	-.00800	-.12300	0.00000	.12728	.00800
49	.90949	.00415	-.01600	-.25015	.01600	-.12300	0.00000	.12715	.01600

FIGURE 10i SAMPLE BODY LINES INTERPOLATED TO FINE GRID

[illegible]

BODY GEOMETRY

[illegible] LLBL = 3 LLBU =11 NPTS =17

[illegible]

[illegible]	[illegible]	[illegible]	.06457	.09686
		2	3	4
[illegible]	[illegible]	[illegible]	0.00000	0.00000
[illegible]	[illegible]	[illegible]	.09176	.07298
[illegible]	[illegible]	[illegible]	.14213	.11304
[illegible]	[illegible]	[illegible]	.13356	.10622
[illegible]	[illegible]	[illegible]	.08277	.06582
[illegible]	[illegible]	[illegible]	-.03197	-.02543
[illegible]	[illegible]	[illegible]	-.02820	-.02243
[illegible]	[illegible]	[illegible]	-.02620	-.02083
[illegible]	[illegible]	[illegible]	-.03053	-.02428
[illegible]	[illegible]	[illegible]	-.03038	-.02416
[illegible]	[illegible]	[illegible]	-.03030	-.02410
[illegible]	[illegible]	[illegible]	-.03025	-.02406
[illegible]	[illegible]	[illegible]	-.03021	-.02402
[illegible]	[illegible]	[illegible]	-.03017	-.02400
[illegible]	[illegible]	[illegible]	-.03014	-.02397
[illegible]	[illegible]	[illegible]	-.03011	-.02394
[illegible]	[illegible]	[illegible]	-.02557	-.02033
[illegible]	[illegible]	[illegible]	-.02554	-.02031
[illegible]	[illegible]	[illegible]	-.02552	-.02029
[illegible]	[illegible]	[illegible]	-.02549	-.02027
[illegible]	[illegible]	[illegible]	-.02547	-.02025
[illegible]	[illegible]	[illegible]	-.02544	-.02023
[illegible]	[illegible]	[illegible]	-.02540	-.02020
[illegible]	[illegible]	[illegible]	-.02536	-.02017
[illegible]	[illegible]	[illegible]	-.02532	-.02014
[illegible]	[illegible]	[illegible]	-.02527	-.02010
[illegible]	[illegible]	[illegible]	.01187	.00944
[illegible]	[illegible]	[illegible]	.01189	.00945
[illegible]	[illegible]	[illegible]	.01190	.00947
[illegible]	[illegible]	[illegible]	.01192	.00948
[illegible]	[illegible]	[illegible]	.01194	.00950
[illegible]	[illegible]	[illegible]	.04953	.03939
[illegible]	[illegible]	[illegible]	.04986	.03965
[illegible]	[illegible]	[illegible]	.05018	.03991
[illegible]	[illegible]	[illegible]	.05050	.04016
[illegible]	[illegible]	[illegible]	.04927	.03918
[illegible]	[illegible]	[illegible]	.04956	.03942
[illegible]	[illegible]	[illegible]	.04985	.03965
[illegible]	[illegible]	[illegible]	.05015	.03988
[illegible]	[illegible]	[illegible]	.02364	.01880
[illegible]	[illegible]	[illegible]	.02370	.01885
[illegible]	[illegible]	[illegible]	.02377	.01890

FIGURE 10A SAMPLE UPPER SURFACE BODY SLOPES

LOWER SURFACE HRCL 5

	[illegible]	.03229	.06457	.09686
[illegible]	1	2	3	4
[illegible]	[illegible]	0.00000	0.00000	0.00000
[illegible]	[illegible]	-.08796	-.06358	-.05740
[illegible]	[illegible]	-.10526	-.09848	-.08891
[illegible]	[illegible]	-.09891	-.09254	-.08355
[illegible]	[illegible]	-.06130	-.05734	-.05177
[illegible]	[illegible]	.02368	.02215	.02000
[illegible]	[illegible]	.02088	.01956	.01764
[illegible]	[illegible]	.01940	.01815	.01639
[illegible]	[illegible]	.02261	.02115	.01910
[illegible]	[illegible]	.02250	.02105	.01900
[illegible]	[illegible]	.02244	.02099	.01895
[illegible]	[illegible]	.02240	.02096	.01892
[illegible]	[illegible]	.02237	.02093	.01890
[illegible]	[illegible]	.02235	.02091	.01888
[illegible]	[illegible]	.02232	.02088	.01885
[illegible]	[illegible]	.02230	.02086	.01883
[illegible]	[illegible]	.01893	.01771	.01599
[illegible]	[illegible]	.01892	.01770	.01598
[illegible]	[illegible]	.01890	.01768	.01596
[illegible]	[illegible]	.01888	.01766	.01595
[illegible]	[illegible]	.01886	.01764	.01593
[illegible]	[illegible]	.01884	.01762	.01591
[illegible]	[illegible]	.01881	.01760	.01589
[illegible]	[illegible]	.01879	.01757	.01587
[illegible]	[illegible]	.01875	.01754	.01584
[illegible]	[illegible]	.01871	.01751	.01581
[illegible]	[illegible]	-.00879	-.00823	-.00743
[illegible]	[illegible]	-.00880	-.00824	-.00744
[illegible]	[illegible]	-.00882	-.00825	-.00745
[illegible]	[illegible]	-.00883	-.00826	-.00746
[illegible]	[illegible]	-.00885	-.00828	-.00747
[illegible]	[illegible]	-.03668	-.03432	-.03098
[illegible]	[illegible]	-.03692	-.03454	-.03119
[illegible]	[illegible]	-.03716	-.03477	-.03139
[illegible]	[illegible]	-.03740	-.03499	-.03159
[illegible]	[illegible]	-.03649	-.03414	-.03082
[illegible]	[illegible]	-.03670	-.03434	-.03100
[illegible]	[illegible]	-.03692	-.03454	-.03119
[illegible]	[illegible]	-.03716	-.03475	-.03137
[illegible]	[illegible]	-.01751	-.01638	-.01479
[illegible]	[illegible]	-.01755	-.01642	-.01483
[illegible]	[illegible]	-.01760	-.01647	-.01487
[illegible]	[illegible]	-.01765	-.01652	-.01491
[illegible]	[illegible]	-.01770	-.01656	-.01495
[illegible]	[illegible]	-.00473	-.00442	-.00399
[illegible]	[illegible]	-.00473	-.00442	-.00399
[illegible]	[illegible]	-.00473	-.00443	-.00400
[illegible]	[illegible]	-.00474	-.00443	-.00400
[illegible]	[illegible]	.00946	.00885	.00799

FIGURE [illegible] SAMPLE LOWER SURFACE BODY SLOPES

SIDE WALL FY S

	[illegible]	-.21549	-.13459	-.08028	-.04481	-.02268	-.00982	-.00265
[illegible]	[illegible]	4	5	6	7	8	9	10
[illegible]	[illegible]	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
[illegible]	[illegible]	.07023	.10756	.10302	.08458	.07180	.06469	.06076
[illegible]	[illegible]	.10877	.16660	.15957	.13101	.11120	.10020	.09412
[illegible]	[illegible]	.10221	.15655	.14994	.12310	.10450	.09415	.08844
[illegible]	[illegible]	.06334	.09701	.09292	.07629	.06476	.05835	.05481
[illegible]	[illegible]	-.02447	-.03747	-.03589	-.02947	-.02501	-.02254	-.02117
[illegible]	[illegible]	-.02150	-.03306	-.03166	-.02599	-.02207	-.01988	-.01868
[illegible]	[illegible]	-.02005	-.03070	-.02941	-.02414	-.02049	-.01847	-.01735
[illegible]	[illegible]	-.02336	-.03578	-.03427	-.02814	-.02388	-.02152	-.02022
[illegible]	[illegible]	-.02325	-.03561	-.03411	-.02800	-.02377	-.02142	-.02012
[illegible]	[illegible]	-.02319	-.03552	-.03402	-.02793	-.02371	-.02136	-.02006
[illegible]	[illegible]	-.02315	-.03545	-.03396	-.02788	-.02367	-.02132	-.02003
[illegible]	[illegible]	-.02312	-.03541	-.03391	-.02784	-.02363	-.02130	-.02000
[illegible]	[illegible]	-.02309	-.03537	-.03387	-.02781	-.02361	-.02127	-.01998
[illegible]	[illegible]	-.02307	-.03533	-.03384	-.02778	-.02358	-.02125	-.01996
[illegible]	[illegible]	-.02304	-.03529	-.03380	-.02775	-.02356	-.02122	-.01994
[illegible]	[illegible]	-.01957	-.02997	-.02870	-.02357	-.02000	-.01802	-.01693
[illegible]	[illegible]	-.01955	-.02994	-.02868	-.02354	-.01998	-.01801	-.01691
[illegible]	[illegible]	-.01953	-.02991	-.02865	-.02352	-.01997	-.01799	-.01690
[illegible]	[illegible]	-.01951	-.02988	-.02862	-.02350	-.01995	-.01797	-.01688
[illegible]	[illegible]	-.01949	-.02985	-.02859	-.02347	-.01992	-.01795	-.01686
[illegible]	[illegible]	-.01947	-.02981	-.02856	-.02344	-.01990	-.01793	-.01684
[illegible]	[illegible]	-.01944	-.02978	-.02852	-.02341	-.01987	-.01791	-.01682
[illegible]	[illegible]	-.01941	-.02973	-.02848	-.02338	-.01985	-.01788	-.01680
[illegible]	[illegible]	-.01938	-.02968	-.02843	-.02334	-.01981	-.01785	-.01677
[illegible]	[illegible]	-.01934	-.02962	-.02837	-.02329	-.01977	-.01781	-.01673
[illegible]	[illegible]	.00909	.01392	.01333	.01094	.00929	.00837	.00786
[illegible]	[illegible]	.00910	.01393	.01335	.01096	.00930	.00838	.00787
[illegible]	[illegible]	.00911	.01395	.01337	.01097	.00931	.00839	.00788
[illegible]	[illegible]	.00913	.01398	.01339	.01099	.00933	.00841	.00790
[illegible]	[illegible]	.00914	.01400	.01341	.01101	.00934	.00842	.00791
[illegible]	[illegible]	.03790	.05805	.05560	.04565	.03875	.03491	.03280
[illegible]	[illegible]	.03816	.05844	.05597	.04595	.03901	.03515	.03301
[illegible]	[illegible]	.03840	.05882	.05634	.04625	.03926	.03538	.03323
[illegible]	[illegible]	.03865	.05919	.05669	.04655	.03951	.03560	.03344
[illegible]	[illegible]	.03770	.05775	.05531	.04541	.03855	.03473	.03262
[illegible]	[illegible]	.03793	.05809	.05564	.04568	.03878	.03494	.03282
[illegible]	[illegible]	.03815	.05843	.05597	.04595	.03901	.03514	.03301
[illegible]	[illegible]	.03838	.05878	.05630	.04622	.03924	.03535	.03321
[illegible]	[illegible]	.01809	.02771	.02654	.02179	.01849	.01666	.01565
[illegible]	[illegible]	.01814	.02778	.02661	.02185	.01855	.01671	.01570
[illegible]	[illegible]	.01819	.02786	.02669	.02191	.01860	.01676	.01574
[illegible]	[illegible]	.01824	.02794	.02676	.02197	.01865	.01680	.01578
[illegible]	[illegible]	.01829	.02802	.02684	.02203	.01870	.01685	.01583
[illegible]	[illegible]	.00488	.00748	.00716	.00588	.00499	.00450	.00423
[illegible]	[illegible]	.00489	.00748	.00717	.00589	.00500	.00450	.00423
[illegible]	[illegible]	.00489	.00749	.00717	.00589	.00500	.00451	.00423
[illegible]	[illegible]	.00489	.00750	.00718	.00590	.00500	.00451	.00424
[illegible]	[illegible]	-.00978	-.01498	-.01435	-.01178	-.01000	-.00901	-.00846

FIGURE 10m SAMPLE SIDE WALL BODY SLOPES

REFERENCE TRAPEZOIDAL WING DESCRIPTION

[illegible]	L.E. SWEEP (DEG.)	T.E. SWEEP DX/DY	T.E. SWEEP (DEG.)	ROOT CHORD	TIP CHORD	WING AREA	ASPECT RATIO	TAPER RATIO	MEAN CHORD	AVERAGE CHORD
[illegible]	44.363	.703	35.121	.384	.141	.233	6.768	.366	.281	.262

ACTUAL INPUT WING PLANFORM CHARATERISTICS

[illegible]	[illegible]	Y	XLEW	XTEW	CORDW	JLE(K)	JTE(K)	NX	(X =XLEW)/C	(X =XIEW)/C	XLEWP	XTEWP	K
[illegible]	[illegible]	0.0000	0.0000	1.0000	1.0000	2	58	57	.0244	.9980	3.1106	0.0000	1
[illegible]	[illegible]	.0323	.1003	.9988	.8985	3	58	56	.0454	.9991	3.0983	.0251	2
[illegible]	[illegible]	.0646	.2004	.9943	.7939	4	57	54	.0518	.9945	3.1017	.1524	3
[illegible]	[illegible]	.0969	.3006	.9906	.6900	5	57	53	.0389	.9990	3.1053	.3580	4
NOMINAL WING ROOT													
[illegible]	[illegible]	.1291	.4008	.9772	.5764	6	55	50	.0011	.9930	3.1029	.6517	5
[illegible]	[illegible]	.1614	.4957	.9850	.4893	8	56	49	.0670	.9973	2.8694	.7025	6
[illegible]	[illegible]	.1937	.5863	1.0077	.4193	10	57	48	.0250	.9921	2.8694	.7025	7
[illegible]	[illegible]	.2260	.6613	1.0302	.3669	16	59	44	.0040	1.0000	1.2144	.7029	8
[illegible]	[illegible]	.2583	.7005	1.0529	.3524	16	59	44	.0040	1.0000	1.2144	.7029	9
[illegible]	[illegible]	.2906	.7397	1.0756	.3359	16	59	44	.0040	1.0000	1.2144	.7029	10
[illegible]	[illegible]	.3229	.7769	1.0983	.3194	16	59	44	.0040	1.0000	1.2144	.7029	11
[illegible]	[illegible]	.3551	.8181	1.1210	.3029	16	59	44	.0040	1.0000	1.2144	.7029	12
[illegible]	[illegible]	.3874	.8573	1.1437	.2864	16	59	44	.0040	1.0000	1.2144	.7029	13
[illegible]	[illegible]	.4197	.8965	1.1664	.2698	16	59	44	.0040	1.0000	1.2144	.7029	14
[illegible]	[illegible]	.4520	.9289	1.1891	.2602	16	59	44	.0040	1.0000	.9773	.7029	15
[illegible]	[illegible]	.4843	.9605	1.2117	.2513	16	59	44	.0040	1.0000	.9773	.7029	16
[illegible]	[illegible]	.5166	.9920	1.2344	.2424	16	59	44	.0040	1.0000	.9773	.7029	17
[illegible]	[illegible]	.5488	1.0236	1.2571	.2336	16	59	44	.0040	1.0000	.9773	.7029	18
[illegible]	[illegible]	.5811	1.0551	1.2798	.2247	16	59	44	.0040	1.0000	.9773	.7029	19
[illegible]	[illegible]	.6134	1.0867	1.3025	.2159	16	59	44	.0040	1.0000	.9772	.7029	20
[illegible]	[illegible]	.6457	1.1182	1.3252	.2070	16	59	44	.0040	1.0000	.9772	.7029	21
[illegible]	[illegible]	.6780	1.1498	1.3479	.1982	16	59	44	.0040	1.0000	.9772	.7029	22
[illegible]	[illegible]	.7103	1.1813	1.3706	.1893	16	59	44	.0040	1.0000	.9772	.7029	23
[illegible]	[illegible]	.7426	1.2129	1.3933	.1804	16	59	44	.0040	1.0000	.9772	.7029	24
[illegible]	[illegible]	.7748	1.2444	1.4160	.1716	16	59	44	.0040	1.0000	.9772	.7029	25
[illegible]	[illegible]	.8071	1.2760	1.4387	.1627	16	59	44	.0040	1.0000	.9772	.7029	26
[illegible]	[illegible]	.8394	1.3075	1.4614	.1539	16	59	44	.0040	1.0000	.9772	.7029	27
[illegible]	[illegible]	.8717	1.3391	1.4841	.1450	16	59	44	.0040	1.0000	.9772	.7029	28

[illegible] =	.3047
[illegible] =	5.1737
[illegible] =	.2023
[illegible] =	.4741
[illegible] =	.6412

FIGURE 10n SAMPLE WING PLANFORM DESCRIPTION

DETAILS OF XI MAPPING

N	ETA	Y	XI=0.0 XLE	XI=1.0 XTE	XLEP	XTEP	UPSTREAM AND XUP	DOWNSTREAM XDOWN	BOUDARIES XIY(UP)	XIY(DN)	K
1	0.0000	0.0000	.5976	1.0062	0.0000	0.0000	-.1106	1.2272	-0.0000	-0.0000	1
2	.0364	.0323	.5976	1.0062	0.0000	0.0000	-.1106	1.2272	-0.0000	-0.0000	2
3	.0727	.0646	.5976	1.0062	0.0000	0.0000	-.1106	1.2272	-0.0000	-0.0000	3
4	.1091	.0969	.5976	1.0062	0.0000	0.0000	-.1106	1.2272	-0.0000	-0.0000	4
NOMINAL WING ROOT											
5	.1455	.1291	.5976	1.0062	.0000	.0000	-.1106	1.2272	-.0000	-.0000	5
6	.1818	.1614	.6010	1.0080	.3212	.1724	-.1044	1.2282	-1.4228	-.2257	6
7	.2182	.1937	.6235	1.0201	1.0338	.5548	-.0638	1.2346	-4.7002	-.7457	7
8	.2545	.2260	.6613	1.0302	1.2144	.7029	.0218	1.2297	-5.6949	-1.1554	8
9	.2909	.2583	.7005	1.0529	1.2144	.7029	.0897	1.2435	-5.9618	-1.2095	9
10	.3273	.2906	.7397	1.0756	1.2144	.7029	.1575	1.2573	-6.2549	-1.2690	10
11	.3636	.3229	.7789	1.0983	1.2144	.7029	.2253	1.2710	-6.5763	-1.3346	11
12	.4000	.3551	.8161	1.1210	1.2144	.7029	.2932	1.2848	-6.9370	-1.4074	12
13	.4364	.3874	.8573	1.1437	1.2144	.7029	.3610	1.2986	-7.3371	-1.4885	13
14	.4727	.4197	.8965	1.1664	1.2144	.7029	.4288	1.3123	-7.7861	-1.5796	14
15	.5091	.4520	.9289	1.1891	.9773	.7029	.4780	1.3298	-5.5847	-2.1315	15
16	.5455	.4843	.9605	1.2117	.9773	.7029	.5249	1.3477	-5.7815	-2.2066	16
17	.5818	.5166	.9920	1.2344	.9773	.7029	.5718	1.3656	-5.9928	-2.2872	17
18	.6182	.5488	1.0236	1.2571	.9773	.7029	.6187	1.3835	-6.2201	-2.3740	18
19	.6545	.5811	1.0551	1.2798	.9773	.7029	.6656	1.4014	-6.4653	-2.4675	19
20	.6909	.6134	1.0867	1.3025	.9772	.7029	.7125	1.4193	-6.7295	-2.5690	20
21	.7273	.6457	1.1182	1.3252	.9772	.7029	.7594	1.4372	-7.0173	-2.6789	21
22	.7636	.6780	1.1498	1.3479	.9772	.7029	.8063	1.4551	-7.3310	-2.7986	22
23	.8000	.7103	1.1813	1.3706	.9772	.7029	.8532	1.4730	-7.6739	-2.9295	23
24	.8364	.7426	1.2129	1.3933	.9772	.7029	.9001	1.4909	-8.0505	-3.0733	24
25	.8727	.7748	1.2444	1.4160	.9772	.7029	.9470	1.5088	-8.4660	-3.2319	25
26	.9091	.8071	1.2760	1.4387	.9772	.7029	.9939	1.5267	-8.9267	-3.4078	26
27	.9455	.8394	1.3075	1.4614	.9772	.7029	1.0408	1.5446	-9.4405	-3.6039	27
28	.9818	.8717	1.3391	1.4841	.9772	.7029	1.0877	1.5625	-10.0170	-3.8240	28
NOMINAL WING TIP											
29	1.0182	.9040	1.3706	1.5068	.9772	.7029	1.1346	1.5804	-10.6685	-4.0727	29
30	1.0545	.9363	1.4022	1.5295	.9772	.7029	1.1815	1.5983	-11.4106	-4.3560	30

CHECK CRUDE MESH GENERATION

FIGURE 10o SAMPLE XI MAPPING

WING SURFACE GEOMETRY

K= 1   Y= 0,0000   ETA = 0,0000   CHORD = 2,6339   TWIST ANGLE = 2,8000

N	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	,063286	,029122	-,004850	,128315	-,065775	7,31196	-3,76320
2	,189515	,042551	-,004827	,017345	-,040161	,99370	-2,29984
3	,290245	,046860	-,003695	-,023979	-,035432	-1,37362	-2,02926
4	,334481	,047645	-,003101	-,037692	-,035025	-2,15858	-2,00598
5	,354992	,047808	-,002828	-,043961	-,035801	-2,51718	-2,05039
6	,368561	,047845	-,002646	-,048443	-,035251	-2,77343	-2,01892
7	,380784	,047827	-,002480	-,052034	-,035426	-2,97867	-2,02892
8	,393416	,047765	-,002314	-,055680	-,036042	-3,18695	-2,06413
9	,408020	,047630	-,002127	-,060374	-,035821	-3,45499	-2,05152
10	,427359	,047350	-,001875	-,066759	-,036477	-3,81936	-2,08904
11	,455521	,046720	-,001535	-,075889	-,036789	-4,33980	-2,10691
12	,495379	,045338	-,001083	-,091042	-,038542	-5,20200	-2,20722
13	,541214	,042950	-,000637	-,110911	-,040494	-6,32889	-2,31888
14	,584877	,039875	-,000300	-,128433	-,042594	-7,31858	-2,43900
15	,626815	,036259	-,000091	-,142101	-,045546	-8,08766	-2,60782
16	,669174	,032016	-,000055	-,155530	-,050806	-8,84037	-2,90848
17	,712880	,027065	-,000279	-,168160	-,058144	-9,54554	-3,32768
18	,757970	,021443	-,000916	-,178339	-,068570	-10,11176	-3,92261
19	,803804	,015285	-,002146	-,187310	-,083681	-10,60916	-4,78345
20	,848691	,008859	-,004177	-,196133	-,104891	-11,09672	-5,98793
21	,889398	,002665	-,006997	-,205935	-,132171	-11,63652	-7,52920
22	,922894	-,002755	-,010299	-,216636	-,163552	-12,22343	-9,28863
23	,950237	-,007471	-,013951	-,227351	-,205011	-12,80850	-11,58571
24	,975089	-,012105	-,018498	-,245213	-,261883	-13,77782	-14,67522
25	1,000000	-,017885	-,024910	-,337557	-,361439	-18,65246	-19,87183

K= 2   Y= ,2269   ETA = ,0741   CHORD = 2,2650   TWIST ANGLE = 2,6393

N	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	,057505	,028061	-,004742	,144381	-,066486	8,21565	-3,80374
2	,174642	,041539	-,004945	,025996	-,039265	1,48915	-2,24856
3	,226082	,044531	-,004487	,003275	-,036180	,18766	-2,07209
4	,249935	,045568	-,004224	-,006889	-,033621	-,39468	-1,92562
5	,265714	,046141	-,004020	-,012447	-,033071	-,71311	-1,89416
6	,279927	,046585	-,003834	-,017432	-,032730	-,99870	-1,87461
7	,294617	,046966	-,003637	-,022613	-,032792	-1,29540	-1,87819
8	,311599	,047315	-,003414	-,028439	-,032785	-1,62901	-1,87777
9	,334088	,047640	-,003106	-,034762	-,032209	-1,99089	-1,84480
10	,366837	,047843	-,002670	-,045045	-,032475	-2,57915	-1,86002
11	,413188	,047567	-,002059	-,059058	-,032784	-3,37988	-1,87774
12	,466488	,046399	-,001405	-,077471	-,034470	-4,42989	-1,97421
13	,517263	,044305	-,000861	-,097707	-,035721	-5,58049	-2,04578
14	,566031	,041294	-,000433	-,117155	-,038309	-6,68204	-2,19385
15	,615290	,037313	-,000137	-,135584	-,041620	-7,72132	-2,38326
16	,666114	,032342	-,000050	-,152180	-,047535	-8,65286	-2,72153
17	,718549	,026384	-,000334	-,160810	-,056332	-9,47029	-3,22417
18	,771848	,019619	-,001218	-,179368	-,069950	-10,16888	-4,00132
19	,824046	,012440	-,002943	-,188950	-,089701	-10,69992	-5,12576

FIGURE 10p SAMPLE WING SURFACE GEOMETRY

RESIDUAL PARAMETERS

MESH	ITER	ERROR	ERRAV	JE	KE	LE	BIGRL	RBDAV	JRD	KRD	LRD	NSUP	LIFT	PJRSD	KPJ
FINE	1	.3286E-01	.4088E-03	9	3	11	.1657E+02	.1058E+00	13	4	10	0	-.0	.7839E-01	4
FINE	2	.3275E-01	.1026E-02	35	4	11	.4136E+02	.5898E+00	13	19	16	0	.4341E-01	.4988E-01	3
FINE	3	.2532E-01	.9394E-03	35	3	11	.1266E+02	.3246E+00	13	4	11	1	.7377E-01	.3374E-01	3
FINE	4	.1858E-01	.8627E-03	35	3	11	.1005E+02	.2508E+00	13	4	11	2	.9703E-01	.2651E-01	3
FINE	5	.1898E-01	.8021E-03	40	1	12	.9864E+01	.2113E+00	13	14	11	26	.1163E+00	.2164E-01	3
FINE	6	.1729E-01	.7603E-03	40	1	12	.9880E+01	.2081E+00	13	14	11	47	.1329E+00	.1858E-01	3
FINE	7	.1415E-01	.7273E-03	40	1	13	.9861E+01	.2128E+00	13	14	11	67	.1472E+00	.1646E-01	3
FINE	8	.1092E-01	.7004E-03	40	2	14	.1377E+02	.2325E+00	13	19	5	91	.1599E+00	.1463E-01	3
FINE	9	.1053E-01	.6774E-03	40	1	14	.1502E+02	.2529E+00	13	19	5	108	.1712E+00	.1305E-01	3
FINE	10	.8887E-02	.6580E-03	40	1	14	.1239E+02	.2607E+00	13	19	5	129	.1817E+00	.1191E-01	3
FINE	11	.7897E-02	.6411E-03	39	1	14	.9095E+01	.2548E+00	13	19	5	151	.1918E+00	.1096E-01	3
FINE	12	.7163E-02	.6251E-03	38	1	13	.8216E+01	.2440E+00	13	19	5	191	.2015E+00	.1018E-01	3
FINE	13	.6763E-02	.6085E-03	40	1	15	.8673E+01	.2338E+00	13	19	5	212	.2110E+00	.9464E-02	3
FINE	14	.6099E-02	.5916E-03	38	1	12	.9377E+01	.2278E+00	13	19	5	230	.2200E+00	.8876E-02	3
FINE	15	.5605E-02	.5742E-03	39	1	15	.9963E+01	.2245E+00	13	19	5	243	.2285E+00	.8383E-02	3
FINE	16	.5153E-02	.5569E-03	33	1	12	.1037E+02	.2237E+00	13	19	16	257	.2364E+00	.7830E-02	8
FINE	17	.4835E-02	.5421E-03	33	1	12	.9914E+01	.2253E+00	13	19	16	267	.2438E+00	.7435E-02	8
FINE	18	.4550E-02	.5291E-03	33	1	12	.9047E+01	.2278E+00	13	19	5	285	.2507E+00	.7061E-02	8
FINE	19	.4437E-02	.5166E-03	39	2	16	.8338E+01	.2288E+00	13	19	5	296	.2573E+00	.6742E-02	8
FINE	20	.4421E-02	.5063E-03	39	1	16	.8043E+01	.2288E+00	13	15	12	314	.2635E+00	.6469E-02	9
FINE	21	.3959E-02	.4961E-03	40	1	5	.9086E+01	.2293E+00	13	15	12	322	.2695E+00	.6233E-02	9
FINE	22	.3656E-02	.4864E-03	32	1	12	.9680E+01	.2312E+00	13	15	12	337	.2752E+00	.6017E-02	9
FINE	23	.3486E-02	.4773E-03	32	9	11	.9924E+01	.2339E+00	13	15	12	349	.2807E+00	.5805E-02	9
FINE	24	.3377E-02	.4687E-03	32	9	11	.9973E+01	.2375E+00	13	15	12	356	.2861E+00	.5601E-02	9
FINE	25	.3267E-02	.4600E-03	32	9	11	.9928E+01	.2409E+00	13	15	12	366	.2913E+00	.5405E-02	9
FINE	26	.3159E-02	.4511E-03	31	9	11	.9804E+01	.2435E+00	13	15	12	371	.2963E+00	.5218E-02	9
FINE	27	.3051E-02	.4420E-03	31	9	11	.1023E+02	.2453E+00	13	16	12	380	.3010E+00	.5038E-02	9
FINE	28	.2941E-02	.4331E-03	31	9	11	.1051E+02	.2471E+00	13	16	12	392	.3057E+00	.4864E-02	9
FINE	29	.2834E-02	.4244E-03	31	9	11	.1062E+02	.2496E+00	13	16	12	392	.3101E+00	.4694E-02	9
FINE	30	.2731E-02	.4164E-03	31	9	11	.1162E+02	.2530E+00	13	15	13	399	.3143E+00	.4532E-02	9
FINE	31	.2635E-02	.4090E-03	31	9	11	.1291E+02	.2572E+00	13	16	13	405	.3184E+00	.4377E-02	9
FINE	32	.2545E-02	.4026E-03	31	8	11	.1458E+02	.2616E+00	13	16	13	406	.3223E+00	.4230E-02	9
FINE	33	.2462E-02	.3970E-03	31	8	11	.1617E+02	.2654E+00	13	16	13	406	.3261E+00	.4092E-02	9
FINE	34	.2395E-02	.3921E-03	33	1	12	.1758E+02	.2684E+00	13	16	13	411	.3297E+00	.3963E-02	9
FINE	35	.2374E-02	.3877E-03	13	15	13	.1875E+02	.2710E+00	13	16	13	418	.3332E+00	.3842E-02	9
FINE	36	.2451E-02	.3834E-03	12	15	13	.1951E+02	.2732E+00	13	16	13	427	.3366E+00	.3728E-02	9
FINE	37	.2447E-02	.3788E-03	11	15	13	.1954E+02	.2751E+00	13	16	13	428	.3399E+00	.3619E-02	9
FINE	38	.2335E-02	.3738E-03	11	15	13	.1841E+02	.2761E+00	13	16	13	436	.3431E+00	.3515E-02	9
FINE	39	.2130E-02	.3680E-03	10	15	13	.1596E+02	.2759E+00	13	16	13	441	.3462E+00	.3417E-02	9
FINE	40	.2059E-02	.3615E-03	33	1	12	.1362E+02	.2740E+00	13	17	13	452	.3493E+00	.3323E-02	9
FINE	41	.2006E-02	.3546E-03	33	1	12	.1312E+02	.2708E+00	13	16	14	462	.3522E+00	.3234E-02	9
FINE	42	.1953E-02	.3474E-03	33	1	12	.1332E+02	.2667E+00	13	16	14	465	.3551E+00	.3151E-02	9
FINE	43	.1901E-02	.3404E-03	33	1	12	.1337E+02	.2624E+00	13	16	14	472	.3579E+00	.3074E-02	9
FINE	44	.1850E-02	.3335E-03	33	1	12	.1328E+02	.2584E+00	13	16	14	477	.3606E+00	.3000E-02	9
FINE	45	.1799E-02	.3269E-03	33	1	12	.1302E+02	.2551E+00	13	16	14	482	.3632E+00	.2930E-02	9
FINE	46	.1747E-02	.3207E-03	33	1	12	.1275E+02	.2524E+00	13	17	14	485	.3658E+00	.2864E-02	9
FINE	47	.1705E-02	.3147E-03	31	9	11	.1250E+02	.2499E+00	13	17	14	487	.3683E+00	.2801E-02	9
FINE	48	.1679E-02	.3090E-03	31	9	11	.1224E+02	.2474E+00	13	17	14	487	.3707E+00	.2741E-02	9
FINE	49	.1653E-02	.3034E-03	31	9	11	.1196E+02	.2445E+00	13	17	14	490	.3731E+00	.2683E-02	9
FINE	50	.1624E-02	.2980E-03	31	9	11	.1161E+02	.2415E+00	13	17	14	494	.3753E+00	.2627E-02	9
FINE	51	.1590E-02	.2928E-03	31	9	11	.1119E+02	.2385E+00	13	17	14	495	.3776E+00	.2571E-02	9
FINE	52	.1551E-02	.2880E-03	31	9	11	.1075E+02	.2360E+00	13	18	14	495	.3797E+00	.2513E-02	9
FINE	53	.1509E-02	.2835E-03	31	9	11	.1047E+02	.2339E+00	13	18	14	494	.3818E+00	.2455E-02	9

FIGURE 10q SAMPLE REMESH ITERATION OUTPUT

COMPUTATIONAL GRID CRUDE EXTERIOR GRID

N	XIEX	ETAX	ZTX
1	-11,60401	0,00000	-16,60489
2	-8,54797	,29171	-12,56308
3	-6,31655	,58343	-9,28592
4	-4,67413	,87514	-6,68344
5	-3,45244	1,16686	-4,66568
6	-2,53125	1,45857	-3,14269
7	-1,82472	1,75029	-2,02451
8	-1,27152	2,04200	-1,22119
9	-,82783	2,33371	-,64275
10	-,46237	2,62543	-,19926
11	-,15278	2,91714	,19926
12	,11689	3,20886	,64275
13	,35806	3,70477	1,22119
14	,57373	4,54783	2,02451
15	,76660	5,98102	3,14269
16	,93909	8,41744	4,66568
17	1,09334	12,55937	6,68344
18	1,23128	19,60064	9,28592
19	1,35464	0,00000	12,56308
20	1,46496	0,00000	16,60489
21	1,57528	0,00000	0,00000
22	1,68560	0,00000	0,00000
23	1,80896	0,00000	0,00000
24	1,95841	0,00000	0,00000
25	2,16001	0,00000	0,00000
26	2,46595	0,00000	0,00000
27	2,98054	0,00000	0,00000
28	3,91243	0,00000	0,00000
29	5,67895	0,00000	0,00000
30	9,11469	0,00000	0,00000

J INDEX OF LEADING AND TRAILING EDGE POINTS AND X LOCATIONS

K	ETAX	JLEX	JTEX	XLEWX	XTEWX
1	0,000000	10	16	1,741062	4,375000
2	,291714	11	16	2,215389	4,375000
3	,583429	12	16	2,689717	4,375000
4	,875143	13	16	3,118238	4,409524
5	1,166857	14	17	3,377540	4,571587
6	1,458571	14	17	3,636841	4,733651
7	1,750286	15	18	3,896143	4,895714
8	2,042000	16	19	4,155444	5,057778
9	2,333714	17	20	4,414746	5,219841
10	2,625429	18	21	4,674048	5,381905
11	2,917143	19	22	4,933349	5,543968

FIGURE 10r SAMPLE CRUDE EXTERIOR GRID OUTPUT

```
OLD SOLUTION TITLE = TACT

K=RITE=   0

KTOLD=   5    KAOLD=  28

        PARAMETERS FROM OLD SOLUTION

        ITERO     JMO     KMO     LMO     LWUO     KTO
         299       62      30      20      11       29

        PJUMPO(K),K=1,KMO
 .1507E+01 .1630E+01 .1794E+01 .2038E+01 .3695E+02 .3979E+02 .4065E+02 .4495E+02
 .4655E+02 .4717E+02 .4702E+02 .4654E+02 .4583E+02 .4497E+02 .4411E+02 .4343E+02
 .4278E+02 .4210E+02 .4133E+02 .4033E+02 .3900E+02 .3735E+02 .3549E+02 .3340E+02
 .3103E+02 .2819E+02 .2412E+02 .1685E+02 .1989E+00 .1989E+00

        XIO(J),J=1,JMO
   -.70809    -.62971    -.55922    -.48952    -.28381    -.10472    -.05394    -.03327
   -.02123    -.01215    -.00400     .00400     .01200     .02008     .02834     .03694
    .04609     .05607     .06720     .07991     .09469     .11210     .13259     .15636
    .18312     .21201     .24192     .27189     .30140     .33030     .35869     .38674
    .41463     .44251     .47052     .49873     .52719     .55594     .58499     .61432
    .64392     .67373     .70368     .73365     .76342     .79269     .82106     .84812
    .87354     .89720     .91928     .94014     .96028     .98015    1.00000    1.02041
   1.04493    1.08256    1.15292    1.27036    1.39794    1.54090

        ETAO(K),K=1,KMO
   0.00000   12.07247   24.14495   36.21742   48.28989   60.36236   72.43484   84.50731
  96.57978  108.65225  120.72473  132.79720  144.86967  156.94215  169.01462  181.08709
 193.15956  205.23204  217.30451  229.37698  241.44945  253.52193  265.59440  277.66687
 289.73935  301.81182  313.88429  325.95676  338.02924  350.10171

        ZTO(L),L=1,LMO
-304.34082-213.15954-143.38501  -92.94930  -58.05458  -34.62960  -19.33054   -9.78126
  -4.23529   -1.13339    1.13339    4.23529    9.78126   19.33054   34.62960   58.05458
  92.94930  143.38501  213.15954  304.34082

        PARAMETERS FROM OLD SOLUTION

        ITERO     JMO     KMO     LMO     LWUO     KTO
         299       30      18      20      11       12

        XIO(J),J=1,JMO
 -10.53733   -7.14316   -4.96335   -3.54251   -2.59602   -1.94601   -1.48130   -1.13239
   -.85587    -.62458    -.42157    -.23623    -.06194     .10546     .26853     .42741
    .58219     .73298     .87989    1.02300    1.16612    1-30924    1.45615    1.61290
   1.79524    2.04413    2.46604    3.33781    5.37920   10.46162

        ETAO(K),K=1,KMO
   0.00000   31.61838   63.23676   94.85514  126.47352  158.09190  189.71029  221.32867
 252.94705  284.56543  316.18381  347.80219  401.55344  492.93056  648.27166  912.35154
1361.287302124.47820
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FIGURE 10s SAMPLE INVISCID RESTART PARAMETERS

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K=  5
DDDSTU(K,J),J=1,NX
   .30112106E-02   .25791287E-02   .24255224E-02   .22058602E-02   .20109323E-02
   .23792092E-02   .28843102E-02   .25459292E-02   .14281317E-02   .21058525E-02
   .26697297E-02   .27761740E-02   .33845928E-02   .34937475E-02   .17429042E-02
   .28886425E-02   .40160195E-02   .17636709E-02   .28250917E-02  -.31754579E-03
  -.12587147E-02   .29518077E-03   .65907943E-03   .28070731E-02  -.11531938E-02
  -.16336444E-02   .28586703E-02   .29548072E-02   .24190870E-02   .28727627E-02
   .28194682E-02   .38861100E-02   .40585351E-02   .19707187E-02   .35243943E-03
  -.75230455E-03  -.70325321E-03  -.47635346E-03  -.24304528E-03  -.12097315E-02
  -.66831384E-03   .16856764E-02  -.95340163E-03   .41646816E-02  -.22387730E-02
   .18463163E-01   .80603406E-01   .15079686E+00

K=  6
DDDSTU(K,J),J=1,NX
   .93712110E-03   .17409806E-02   .20675261E-02   .21070304E-02  -.39770620E-02
   .44157420E-02   .46025266E-02   .35200572E-02   .26606315E-02   .36819930E-02
   .32199314E-02   .29944572E-02   .35110001E-02   .31087304E-02   .29524253E-02
   .27208631E-02   .21445592E-02   .15445335E-02   .10206828E-02   .94904824E-03
   .25960919E-03  -.12071814E-03   .94194942E-03   .22043799E-02   .12940978E-02
   .20566775E-02   .21341126E-02   .22665238E-02   .20879388E-02   .25779399E-02
   .21804502E-02   .20562558E-02   .82701746E-03   .14478324E-03   .30045655E-03
   .13182455E-03  -.30739732E-03  -.26828562E-03  -.16655249E-02  -.39547361E-04
   .99488374E-03  -.38335716E-03   .35785630E-02   .12175003E-02   .14282675E-01
   .15787552E+00   .21916698E+00

K=  7
DDDSTU(K,J),J=1,NX
   .58511251E-03   .13625219E-02   .20088532E-02   .31723872E-02   .44468150E-02
  -.16991463E-02   .26149392E-02   .38799220E-02   .36482551E-02   .30630131E-02
   .28696602E-02   .28024835E-02   .23281313E-02   .18540405E-02   .14492629E-02
   .10064711E-02   .98972982E-03   .78722610E-03   .94969771E-03   .12249501E-02
   .15870740E-02   .18824342E-02   .20283459E-02   .22570938E-02   .23198559E-02
   .23500073E-02   .21066718E-02   .14712519E-02   .52702777E-03   .16226015E-03
   .13972028E-03  -.50170592E-05  -.35169479E-03  -.33496535E-03  -.49177010E-03
  -.56170232E-03  -.28739873E-04   .96486680E-03   .10025764E-02   .43322682E-02
   .44145426E-01   .56389182E-01   .94213803E-01

K=  8
DDDSTU(K,J),J=1,NX
   .16197651E-03   .11686529E-02   .15342818E-02   .26833087E-02   .40265707E-02
   .44957948E-02  -.72981874E-02   .55685463E-02   .40127715E-02   .32205941E-02
   .24013924E-02   .24775302E-02   .21652317E-02   .18748741E-02   .15285689E-02
   .14905573E-02   .14362445E-02   .14098267E-02   .14393530E-02   .15801972E-02
   .17990499E-02   .21216444E-02   .23684622E-02   .23995245E-02   .24191951E-02
   .23427529E-02   .22167871E-02   .13482890E-02   .60647124E-03   .28943279E-03
   .12174401E-04   .65725150E-04  -.65578705E-03  -.16626700E-03  -.61382875E-03
  -.69487324E-03   .10861761E-02   .11181041E-02  -.13252622E-02   .60824962E-02
   .78500055E-02   .44687269E-01  -.21177198E-01  -.87018525E-01
```

FIGURE 10t SAMPLE VISCOUS RESTART PARAMETERS

MESH	RESIDUAL ITER	PARAMETERS ERROR	ERRAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJRSD	KPJ
FINE	241	.1366E-03	.1858E-04	20	14	4	.4257E+02	.1215E+01	15	27	19	17221	.4101E+00	.5862E-04	26
COARSE	242	.9687E-04	.1366E-04	25	1	17	.4181E-01	.2152E-02	16	6	10	1661			
FINE	243	.1358E-03	.1867E-04	19	14	4	.5357E+02	.1231E+01	15	29	19	17204	.4103E+00	.5675E-04	26
COARSE	244	.9490E-04	.1343E-04	25	1	17	.4141E-01	.2119E-02	16	6	10	1666			
FINE	245	.1343E-03	.1877E-04	19	14	4	.5657E+02	.1249E+01	15	29	19	17187	.4104E+00	.5484E-04	26
COARSE	246	.9332E-04	.1321E-04	24	1	17	.4091E-01	.2088E-02	16	6	10	1669			
FINE	247	.1318E-03	.1887E-04	18	14	4	.7995E+02	.1267E+01	16	28	19	17171	.4106E+00	.5310E-04	26
COARSE	248	.9181E-04	.1300E-04	24	1	17	.4036E-01	.2058E-02	16	6	10	1671			
FINE	249	.1336E-03	.1899E-04	14	28	19	.1094E+03	.1288E+01	16	28	19	17147	.4108E+00	.5167E-04	26
COARSE	250	.9031E-04	.1279E-04	24	1	17	.3977E-01	.2029E-02	16	6	10	1672			
FINE	251	.1603E-03	.1909E-04	13	28	19	.1291E+03	.1309E+01	15	28	19	17128	.4110E+00	.5069E-04	26
COARSE	252	.8883E-04	.1259E-04	24	1	17	.3936E-01	.2001E-02	15	5	10	1674			
FINE	253	.1584E-03	.1915E-04	12	28	19	.1249E+03	.1329E+01	15	28	19	17113	.4112E+00	.5012E-04	26
COARSE	254	.8737E-04	.1239E-04	24	1	17	.3898E-01	.1973E-02	15	5	10	1678			
FINE	255	.1261E-03	.1920E-04	20	17	4	.9226E+02	.1346E+01	15	28	19	17103	.4114E+00	.4970E-04	26
COARSE	256	.8591E-04	.1220E-04	24	1	17	.3859E-01	.1946E-02	15	5	10	1677			
FINE	257	.1261E-03	.1925E-04	19	17	4	.8296E+02	.1366E+01	16	28	18	17086	.4115E+00	.4947E-04	26
COARSE	258	.8447E-04	.1201E-04	24	1	17	.3819E-01	.1919E-02	15	5	10	1676			
FINE	259	.1253E-03	.1931E-04	19	17	4	.9460E+02	.1391E+01	16	28	18	17075	.4117E+00	.4932E-04	26
COARSE	260	.8303E-04	.1183E-04	24	1	17	.3777E-01	.1893E-02	15	5	10	1675			
FINE	261	.1302E-03	.1931E-04	13	28	18	.9717E+02	.1419E+01	16	28	18	17060	.4119E+00	.4916E-04	26
COARSE	262	.8160E-04	.1165E-04	24	1	17	.3734E-01	.1867E-02	15	5	10	1674			
FINE	263	.1212E-03	.1922E-04	18	17	4	.8508E+02	.1438E+01	15	28	18	17053	.4121E+00	.4893E-04	26
COARSE	264	.8017E-04	.1147E-04	24	1	17	.3687E-01	.1840E-02	15	5	10	1682			
FINE	265	.1181E-03	.1910E-04	17	17	4	.8367E+02	.1449E+01	16	27	19	17031	.4123E+00	.4861E-04	26
COARSE	266	.7874E-04	.1129E-04	24	1	17	.3634E-01	.1814E-02	15	5	10	1696			
FINE	267	.1307E-03	.1897E-04	14	27	19	.9215E+02	.1459E+01	16	27	19	17019	.4125E+00	.4817E-04	26
COARSE	268	.7732E-04	.1112E-04	24	1	17	.3576E-01	.1787E-02	15	5	10	1706			
FINE	269	.1309E-03	.1883E-04	13	27	19	.9145E+02	.1474E+01	16	27	19	16991	.4127E+00	.4762E-04	26
COARSE	270	.7591E-04	.1094E-04	24	1	17	.3511E-01	.1760E-02	15	5	10	1719			
FINE	271	.1111E-03	.1865E-04	12	27	19	.7651E+02	.1486E+01	16	27	19	16976	.4128E+00	.4696E-04	26
COARSE	272	.7449E-04	.1076E-04	24	1	17	.3438E-01	.1732E-02	15	5	10	1732			
FINE	273	.9602E-04	.1842E-04	15	17	4	.5356E+02	.1489E+01	15	27	19	16947	.4130E+00	.4622E-04	26
COARSE	274	.7308E-04	.1058E-04	24	1	17	.3357E-01	.1704E-02	15	5	10	1737			
FINE	275	.9146E-04	.1819E-04	30	18	10	.5293E+02	.1487E+01	17	27	18	16936	.4132E+00	.4540E-04	26
COARSE	276	.7167E-04	.1041E-04	24	1	17	.3268E-01	.1676E-02	15	5	10	1743			

FIGURE 10u SAMPLE INVISCID ITERATION OUTPUT

```
      PJUMP RESIDUALS , K=1,KTIP=1
,2559E-02   ,2883E-02   ,3054E-02   ,3142E-02   ,5596E-01   ,6301E-01
,7103E-01   ,8251E-01   ,8971E-01   ,9421E-01   ,9611E-01   ,9579E-01
,9363E-01   ,9022E-01   ,8561E-01   ,8066E-01   ,7594E-01   ,7069E-01
,6419E-01   ,5784E-01   ,5374E-01   ,5002E-01   ,4562E-01   ,4227E-01
,3918E-01   ,3423E-01   ,2211E-01   ,1112E-01
```

FIGURE 10v SAMPLE PJUMP RESIDUALS OUTPUT

ERPLOT FOR FINE MESH

INITIAL ERROR(*) IS .2548E-01 INITIAL RESIDUAL(+) IS .6108E+04

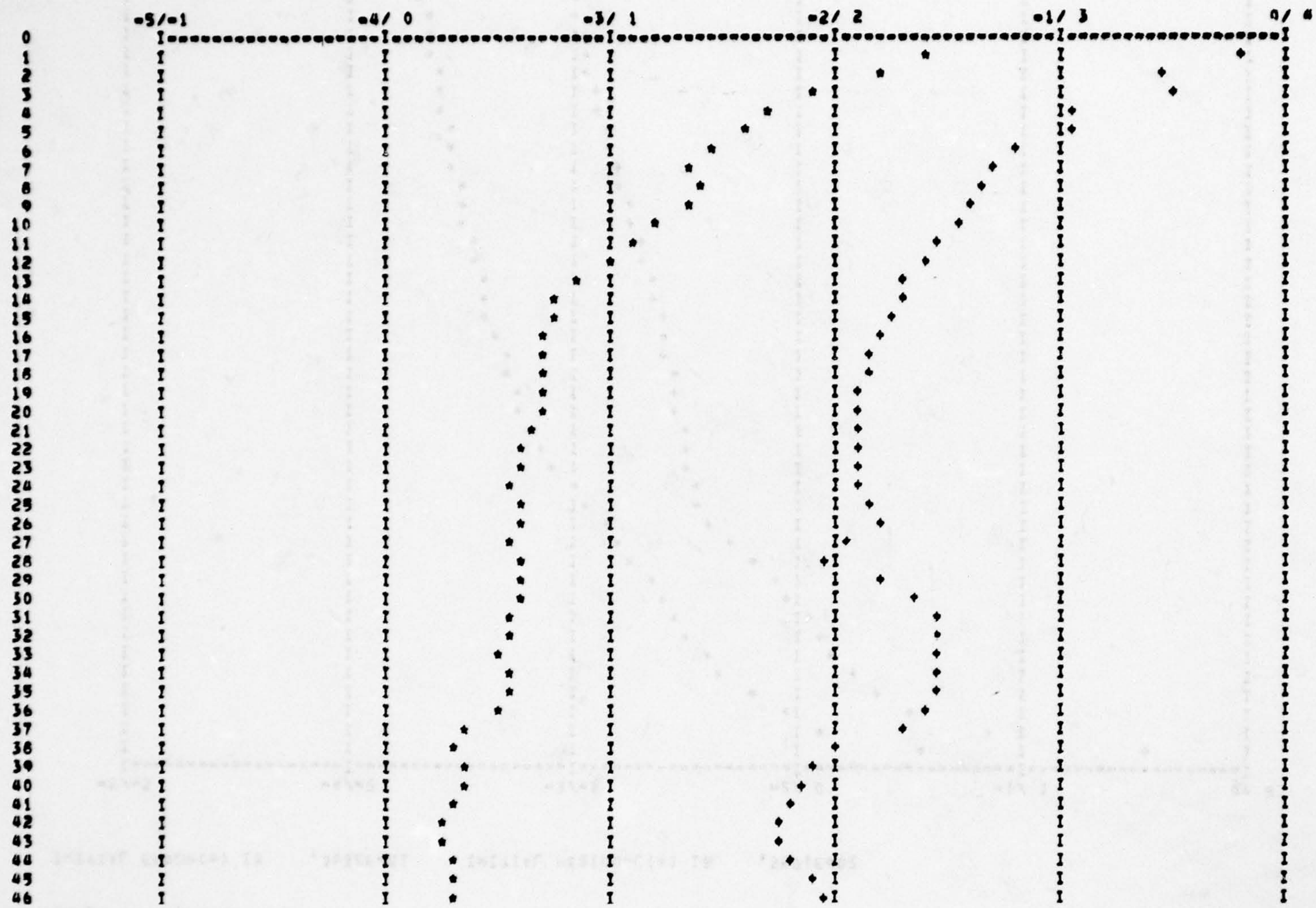

FIGURE 10w SAMPLE ERROR PLOT FOR FINE MESH

AD-A054 998 GRUMMAN AEROSPACE CORP BETHPAGE N Y F/G 20/4
AN AUTOMATED PROCEDURE FOR COMPUTING THE THREE-DIMENSIONAL TRAN--ETC(U)
FEB 78 W H MASON, D MACKENZIE, M STERN F33615-75-C-3073
UNCLASSIFIED AFFDL-TR-77-122-VOL-2 NL

2 OF 5
AD
A054 998

ERPLOT FOR COARSE MESH

INITIAL ERROR(*) IS .3632E-01 INITIAL RESIDUAL(+) IS .3591E+02

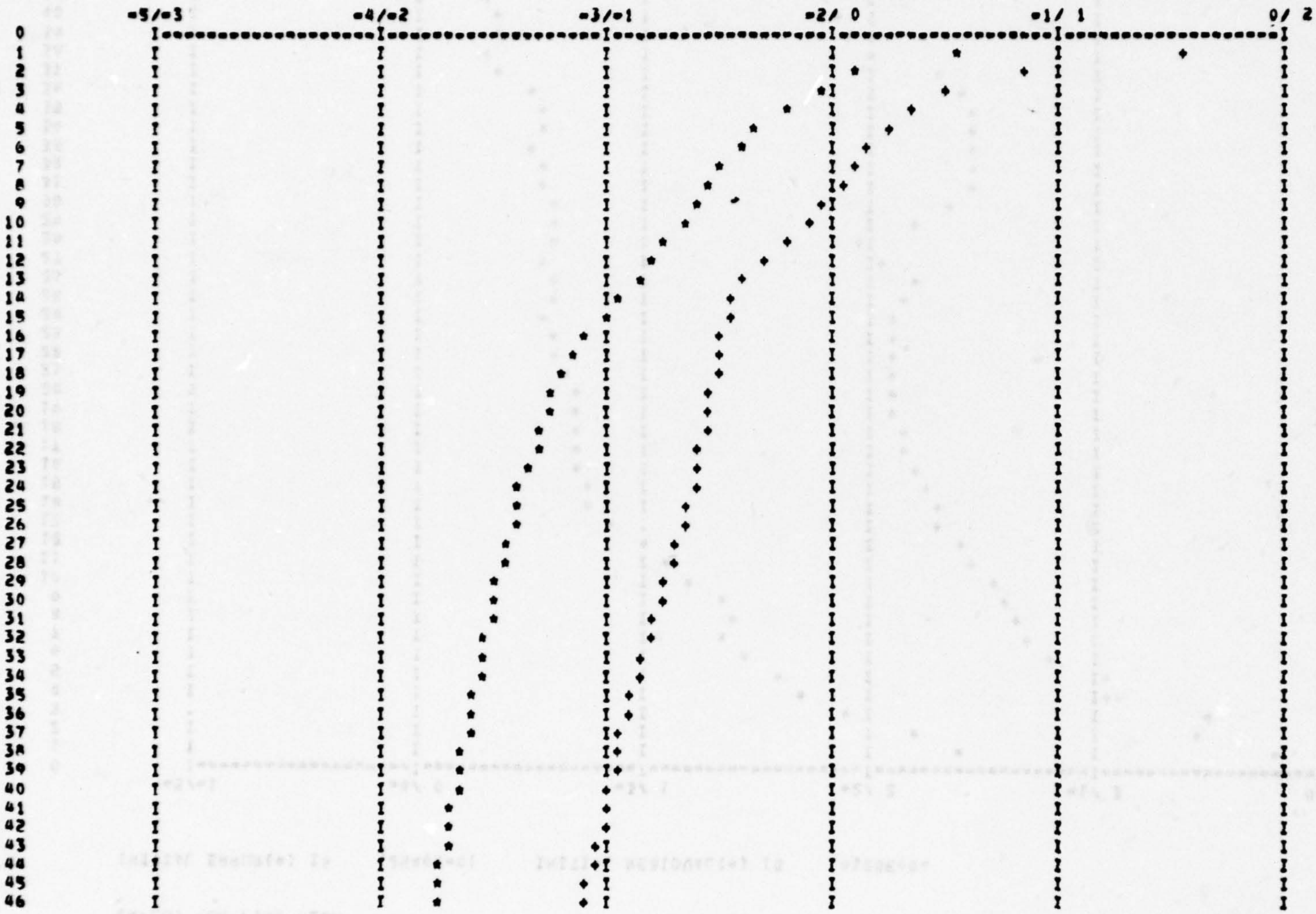

FIGURE 10x SAMPLE ERROR PLOT FOR COARSE MESH

VISCOUS FLOW CALCULATION

ITERATION NO., 1 ON GRID NO. 1

LIFT FROM INTEGRATION OF DELTA PHI AT TE IS .52160E+00

TOTAL CHANGE OF PRESSURE SOLUTION

TOP IS .1563E+06 BOTTOM IS .2191E+06 IN TERMS OF THE CONVERGENCE CRITERION

UPPER SURFACE

SPAN STATION	MAX CP CHANGE	NEW CP AT MAX CHANGES	OLD CP AT MAX CHANGE	LOCATION OF MAX CHGE	AVERAGE CHANGE
5	2.03	.29958E-01	-.20000E+01	1	1.71
6	2.06	.55794E-01	-.20000E+01	1	1.67
7	2.05	.48760E-01	-.20000E+01	1	1.62
8	2.13	.13047E+00	-.20000E+01	1	1.56
9	2.24	.23817E+00	-.20000E+01	1	1.47
10	2.73	.72696E+00	-.20000E+01	1	1.37
11	2.73	.72791E+00	-.20000E+01	1	1.37
12	2.69	.68894E+00	-.20000E+01	1	1.37
13	2.63	.63297E+00	-.20000E+01	1	1.38
14	2.57	.56717E+00	-.20000E+01	1	1.39
15	2.51	.51133E+00	-.20000E+01	1	1.39
16	2.50	.49635E+00	-.20000E+01	1	1.40
17	2.48	.48133E+00	-.20000E+01	1	1.40
18	2.47	.46554E+00	-.20000E+01	1	1.40
19	2.45	.44903E+00	-.20000E+01	1	1.40
20	2.43	.43189E+00	-.20000E+01	1	1.41
21	2.41	.41413E+00	-.20000E+01	1	1.42
22	2.40	.39578E+00	-.20000E+01	1	1.44
23	2.38	.37684E+00	-.20000E+01	1	1.45
24	2.36	.35721E+00	-.20000E+01	1	1.47
25	2.34	.33646E+00	-.20000E+01	1	1.49
26	2.31	.31491E+00	-.20000E+01	1	1.52
27	2.29	.29378E+00	-.20000E+01	1	1.57
28	2.21	.20688E+00	-.20000E+01	1	1.65

LOWER SURFACE

SPAN STATION	MAX CP CHANGE	NEW CP AT MAX CHANGES	OLD CP AT MAX CHANGE	LOCATION OF MAX CHGE	AVERAGE CHANGE
5	2.61	.60882E+00	-.20000E+01	45	2.04
6	2.82	.81527E+00	-.20000E+01	1	2.08
7	2.66	.65754E+00	-.20000E+01	1	2.09

FIGURE 10y SAMPLE PRESSURE CONVERGENCE HISTORY

INVISCID SOLUTION AT SPAN STATION 5 Y/S= 48.2899

J	X/C	CPU	CPL	EMU	EML
1	.47387E-01	.29958E-01	.17550E+00	.88323E+00	.79678E+00
2	.92060E-01	-.47308E-01	.16279E+00	.92586E+00	.80470E+00
3	.11025E+00	-.78764E-01	.15762E+00	.94266E+00	.80790E+00
4	.12084E+00	-.97089E-01	.15460E+00	.95231E+00	.80976E+00
5	.12884E+00	-.11092E+00	.15233E+00	.95952E+00	.81116E+00
6	.13601E+00	-.12332E+00	.15029E+00	.96595E+00	.81242E+00
7	.14304E+00	-.13548E+00	.14829E+00	.97221E+00	.81364E+00
8	.15008E+00	-.13255E+00	.13040E+00	.97071E+00	.82454E+00
9	.15719E+00	-.13206E+00	.10632E+00	.97046E+00	.83898E+00
10	.16445E+00	-.13420E+00	.77257E-01	.97156E+00	.85610E+00
11	.17202E+00	-.13265E+00	.46742E-01	.97076E+00	.87370E+00
12	.18008E+00	-.12468E+00	.17715E-01	.96666E+00	.89012E+00
13	.18885E+00	-.11141E+00	-.58347E-02	.95978E+00	.90323E+00
14	.19864E+00	-.96056E-01	-.17748E-01	.95177E+00	.90979E+00
15	.20983E+00	-.80301E-01	-.11240E-01	.94347E+00	.90621E+00
16	.22284E+00	-.64922E-01	.11240E-01	.93530E+00	.89375E+00
17	.23815E+00	-.52246E-01	.36211E-01	.92851E+00	.87970E+00
18	.25618E+00	-.43964E-01	.54783E-01	.92405E+00	.86910E+00
19	.27710E+00	-.31463E-01	.70308E-01	.91728E+00	.86014E+00
20	.30064E+00	-.50737E-01	.36482E-01	.92770E+00	.87954E+00
21	.32606E+00	-.11753E+00	-.60707E-01	.96296E+00	.93305E+00
22	.35237E+00	-.15364E+00	-.10637E+00	.98149E+00	.95716E+00
23	.37874E+00	-.15841E+00	-.11250E+00	.98391E+00	.96035E+00
24	.40470E+00	-.17656E+00	-.17130E+00	.99308E+00	.99043E+00
25	.43014E+00	-.28363E+00	-.35677E+00	.10455E+01	.10798E+01
26	.45511E+00	-.38000E+00	-.53518E+00	.10905E+01	.11593E+01
27	.47979E+00	-.37612E+00	-.57585E+00	.10887E+01	.11767E+01
28	.50433E+00	-.37302E+00	-.56780E+00	.10873E+01	.11733E+01
29	.52886E+00	-.37241E+00	-.52474E+00	.10870E+01	.11548E+01
30	.55350E+00	-.37333E+00	-.46117E+00	.10875E+01	.11270E+01
31	.57832E+00	-.37736E+00	-.40749E+00	.10893E+01	.11030E+01
32	.60337E+00	-.37127E+00	-.39174E+00	.10865E+01	.10959E+01
33	.62866E+00	-.35176E+00	-.40895E+00	.10775E+01	.11037E+01
34	.65422E+00	-.33851E+00	-.42293E+00	.10714E+01	.11100E+01
35	.68003E+00	-.35117E+00	-.23378E+00	.10772E+01	.10214E+01
36	.70607E+00	-.37989E+00	.92612E-01	.10905E+01	.84710E+00
37	.73229E+00	-.40376E+00	.26220E+00	.11013E+01	.74050E+00
38	.75865E+00	-.43448E+00	.32530E+00	.11152E+01	.69668E+00
39	.78501E+00	-.48137E+00	.38444E+00	.11359E+01	.65295E+00
40	.81121E+00	-.53160E+00	.44171E+00	.11578E+01	.60762E+00
41	.83696E+00	-.57390E+00	.49506E+00	.11759E+01	.56210E+00
42	.86192E+00	-.61916E+00	.54102E+00	.11949E+01	.51970E+00
43	.88573E+00	-.65675E+00	.57679E+00	.12105E+01	.48414E+00

FIGURE 10z SAMPLE VISCOUS-INVISCID INTERACTION SOLUTION

```
BOUNDARY LAYER CALCULATION AT STRIP    6 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  47.15

SEPARATION DETECTED IN TURBULENT B. L. CALC AT   X/C=          .965

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP   -6 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  47.15

SEPARATION DETECTED IN TURBULENT B. L. CALC AT   X/C=          .650

B.L. CALC. TERMINATES AT THIS POINT
```

FIGURE 10aa SAMPLE OUTPUT OF BOUNDARY LAYER SOLUTION

NEW DISPLACEMENT THICKNESS
AT STATION 5

J	X/C	D-TOP	CHANGE	INP-SLP	ACT-SLP	D-BOT	CHANGL	INP-SLP	ACT-SLP	*BCU	*BCL
1	.047	.1283E-03	.1000E+01	.1735E-02	.2892E-02	.1506E-03	.1000E+01	.2343E-02	.3905E-02	-.6900E-01	-.1218E+00
2	.092	.2173E-03	.1000E+01	.1496E-02	.2493E-02	.2570E-03	.1000E+01	.1981E-02	.3301E-02	-.3067E-01	-.7497E-01
3	.110	.2617E-03	.1000E+01	.1464E-02	.2440E-02	.3124E-03	.1000E+01	.1706E-02	.2844E-02	-.2111E-01	-.6149E-01
4	.121	.2883E-03	.1000E+01	.1460E-02	.2434E-02	.3377E-03	.1000E+01	.1114E-02	.1856E-02	-.1676E-01	-.5501E-01
5	.129	.3051E-03	.1000E+01	.1088E-02	.1813E-02	.3538E-03	.1000E+01	.1430E-02	.2383E-02	-.1367E-01	-.5132E-01
6	.136	.3193E-03	.1000E+01	.1403E-02	.2339E-02	.3716E-03	.1000E+01	.1416E-02	.2360E-02	-.1140E-01	-.4855E-01
7	.143	.3386E-03	.1000E+01	.1878E-02	.3130E-02	.3867E-03	.1000E+01	.1198E-02	.1997E-02	-.9460E-02	-.4636E-01
8	.150	.3611E-03	.1000E+01	.1762E-02	.2936E-02	.4004E-03	.1000E+01	.1156E-02	.1927E-02	-.7522E-02	-.4483E-01
9	.157	.3772E-03	.1000E+01	.1166E-02	.1944E-02	.4140E-03	.1000E+01	.1132E-02	.1886E-02	-.5605E-02	-.4385E-01
10	.164	.3968E-03	.1000E+01	.2202E-02	.3670E-02	.4276E-03	.1000E+01	.1116E-02	.1860E-02	-.4380E-02	-.4290E-01
11	.172	.4271E-03	.1000E+01	.2347E-02	.3912E-02	.4414E-03	.1000E+01	.1076E-02	.1793E-02	-.2821E-02	-.4177E-01
12	.180	.4550E-03	.1000E+01	.1774E-02	.2956E-02	.4559E-03	.1000E+01	.1015E-02	.1691E-02	-.9673E-03	-.4040E-01
13	.189	.4794E-03	.1000E+01	.1795E-02	.2992E-02	.4700E-03	.1000E+01	.9772E-03	.1629E-02	.7074E-03	-.3875E-01
14	.199	.5166E-03	.1000E+01	.2697E-02	.4495E-02	.4857E-03	.1000E+01	.9415E-03	.1569E-02	.2121E-02	-.3669E-01
15	.210	.5698E-03	.1000E+01	.2732E-02	.4553E-02	.5021E-03	.1000E+01	.8159E-03	.1360E-02	.3960E-02	-.3406E-01
16	.223	.6232E-03	.1000E+01	.2635E-02	.4391E-02	.5189E-03	.1000E+01	.7680E-03	.1280E-02	.5959E-02	-.3122E-01
17	.238	.6930E-03	.1000E+01	.2564E-02	.4273E-02	.5385E-03	.1000E+01	.6350E-03	.1058E-02	.8034E-02	-.2830E-01
18	.256	.7574E-03	.1000E+01	.1371E-02	.2286E-02	.5565E-03	.1000E+01	.7053E-03	.1176E-02	.1054E-01	-.2557E-01
19	.277	.7704E-03	.1000E+01	.1677E-02	.2795E-02	.5717E-03	.1000E+01	.4467E-03	.7446E-03	.1247E-01	-.2300E-01
20	.301	.7479E-03	.1000E+01	-.3718E-03	-.6197E-03	.5814E-03	.1000E+01	.1616E-03	.2693E-03	.1534E-01	-.2090E-01
21	.326	.7804E-03	.1000E+01	-.1851E-02	-.3084E-02	.5841E-03	.1000E+01	-.2611E-04	-.4351E-04	.1807E-01	-.1920E-01
22	.352	.7621E-03	.1000E+01	-.5833E-03	-.9722E-03	.5815E-03	.1000E+01	-.6128E-04	-.1021E-03	.2014E-01	-.1690E-01
23	.379	.7623E-03	.1000E+01	.5284E-03	.8806E-03	.5790E-03	.1000E+01	-.8552E-05	-.1425E-04	.2241E-01	-.1408E-01
24	.405	.7071E-03	.1000E+01	.2407E-02	.4011E-02	.5833E-03	.1000E+01	.1725E-03	.2876E-03	.2404E-01	-.1111E-01
25	.430	.7013E-03	.1000E+01	.3594E-03	.5990E-03	.5935E-03	.1000E+01	.3367E-03	.5612E-03	.2682E-01	-.7875E-02
26	.455	.7645E-03	.1000E+01	-.2758E-02	-.4597E-02	.6110E-03	.1000E+01	.6719E-03	.1120E-02	.2975E-01	-.4296E-02
27	.480	.7271E-03	.1000E+01	.8161E-03	.1360E-02	.6474E-03	.1000E+01	.5916E-03	.9860E-03	.2994E-01	-.3574E-03
28	.504	.7732E-03	.1000E+01	.2003E-02	.3339E-02	.6957E-03	.1000E+01	.1348E-02	.2247E-02	.3101E-01	.3084E-02
29	.529	.8456E-03	.1000E+01	.1504E-02	.2507E-02	.7560E-03	.1000E+01	.1941E-02	.3234E-02	.3276E-01	.7154E-02
30	.554	.9006E-03	.1000E+01	.1630E-02	.2716E-02	.8414E-03	.1000E+01	.2175E-02	.3624E-02	.3442E-01	.1347E-01
31	.578	.9710E-03	.1000E+01	.1363E-02	.2271E-02	.9610E-03	.1000E+01	.2825E-02	.4709E-02	.3631E-01	.2196E-01
32	.603	.1051E-02	.1000E+01	.1286E-02	.2143E-02	.1125E-02	.1000E+01	.4373E-02	.7288E-02	.3806E-01	.3280E-01
33	.629	.1121E-02	.1000E+01	.2230E-02	.3717E-02	.1376E-02	.1000E+01	.7156E-02	.1193E-01	.3961E-01	.4357E-01
34	.654	.1180E-02	.1000E+01	.2774E-02	.4623E-02	.1780E-02	.1000E+01	.1340E-01	.2234E-01	.4213E-01	.4790E-01
35	.680	.1223E-02	.1000E+01	.8055E-03	.1342E-02	.2652E-02	.1000E+01	.2673E-01	.4455E-01	.4649E-01	.4448E-01
36	.706	.1239E-02	.1000E+01	-.3552E-03	-.5921E-03	.3812E-02	.1000E+01	.2673E-01	.4455E-01	.5125E-01	.4180E-01
37	.732	.1228E-02	.1000E+01	-.3435E-03	-.5726E-03	.4981E-02	.1000E+01	.2673E-01	.4455E-01	.5529E-01	.3649E-01
38	.759	.1198E-02	.1000E+01	-.5278E-03	-.8796E-03	.6155E-02	.1000E+01	.2673E-01	.4455E-01	.5850E-01	.2947E-01
39	.785	.1180E-02	.1000E+01	-.5330E-03	-.8883E-03	.7329E-02	.1000E+01	.2673E-01	.4455E-01	.6467E-01	.2121E-01
40	.811	.1146E-02	.1000E+01	-.7307E-03	-.1218E-02	.8496E-02	.1000E+01	.2673E-01	.4455E-01	.7265E-01	.1117E-01
41	.837	.1120E-02	.1000E+01	-.5371E-03	-.8952E-03	.9643E-02	.1000E+01	.2673E-01	.4455E-01	.8162E-01	-.1292E-03
42	.862	.1117E-02	.1000E+01	.2325E-03	.3874E-03	.1076E-01	.1000E+01	.2673E-01	.4455E-01	.8866E-01	-.1361E-01
43	.886	.1113E-02	.1000E+01	-.3448E-03	-.5746E-03	.1182E-01	.1000E+01	.2673E-01	.4455E-01	.9997E-01	-.2799E-01
44	.908	.1111E-02	.1000E+01	.6337E-03	.1056E-02	.1281E-01	.1000E+01	.2673E-01	.4455E-01	.1050E+00	-.4390E-01
45	.929	.1171E-02	.1000E+01	.2951E-02	.4919E-02	.1374E-01	.1000E+01	.2673E-01	.4455E-01	.1125E+00	-.6354E-01
46	.948	.1325E-02	.1000E+01	.6994E-02	.1166E-01	.1460E-01	.1000E+01	.2673E-01	.4455E-01	.1173E+00	-.8312E-01
47	.967	.1600E-02	.1000E+01	.1018E-01	.1696E-01	.1542E-01	.1000E+01	.2673E-01	.4455E-01	.1186E+00	-.1035E+00
48	.984	.1901E-02	.1000E+01	.1018E-01	.1696E-01	.1621E-01	.1000E+01	.2673E-01	.4455E-01	.1257E+00	-.1299E+00

FIGURE 10bb SAMPLE BOUNDARY LAYER OUTPUT

TOTAL VISCOUS DRAG COEFFICIENT IS ,717E+03 TOP VISCOUS DRAG IS ,286E+03 BOTTOM VISCOUS DRAG IS ,133E+03

K	CFFKU	CFFKL	MACHUP	SONPU	SHKPU	MACHDN	SONPL	SHKPL
5	,103E-01	,666E-02	1	,408E+00	0,	2	,407E+00	,683E+00
6	,106E-01	,667E-02	3	,330E+00	,913E-01	2	,344E+00	,649E+00
7	,112E-01	,653E-02	1	,225E+00	0,	2	,284E+00	,616E+00
8	,120E-01	,645E-02	1	,610E-01	0,	2	,220E+00	,585E+00
9	,121E-01	,627E-02	1	,260E-01	0,	2	,119E+00	,534E+00
10	,465E-02	,272E-02	1	,123E-01	0,	2	,319E-01	,490E+00
11	,473E-02	,273E-02	1	,142E-01	0,	2	,346E-01	,478E+00
12	,473E-02	,274E-02	1	,146E-01	0,	2	,356E-01	,462E+00
13	,469E-02	,275E-02	1	,144E-01	0,	2	,367E-01	,447E+00
14	,474E-02	,276E-02	1	,138E-01	0,	2	,395E-01	,427E+00
15	,470E-02	,278E-02	1	,133E-01	0,	2	,429E-01	,407E+00
16	,472E-02	,280E-02	1	,133E-01	0,	2	,438E-01	,388E+00
17	,481E-02	,282E-02	1	,133E-01	0,	2	,440E-01	,367E+00
18	,486E-02	,283E-02	1	,132E-01	0,	2	,440E-01	,345E+00
19	,483E-02	,285E-02	1	,131E-01	0,	2	,438E-01	,322E+00
20	,475E-02	,286E-02	1	,131E-01	0,	2	,435E-01	,300E+00
21	,490E-02	,288E-02	1	,130E-01	0,	2	,430E-01	,303E+00
22	,486E-02	,290E-02	1	,129E-01	0,	2	,423E-01	,301E+00
23	,484E-02	,292E-02	1	,128E-01	0,	2	,415E-01	,295E+00
24	,476E-02	,295E-02	1	,127E-01	0,	2	,408E-01	,290E+00
25	,474E-02	,299E-02	1	,126E-01	0,	2	,399E-01	,284E+00
26	,468E-02	,303E-02	1	,125E-01	0,	2	,386E-01	,270E+00
27	,460E-02	,308E-02	2	,124E-01	,100E+01	2	,340E-01	,247E+00
28	,455E-02	,346E-02	4	,641E+00	,979E+00	2	,209E-01	,217E+00

FIGURE 10cc SAMPLE DRAG ESTIMATE AND SKIN FRICTION TABLE

K	ETA	UPPER SEP,	LOWER SEP,	SEPU(K)-MOD	SEPU-SMTH
5	48,2899	,9624	,6770	,9124	,9124
6	60,3624	,9648	,6505	,9148	,9205
7	72,4348	,9686	,6290	,9186	,9309
8	84,5073	,9793	,6109	,9793	,9403
9	96,5798	,9557	,5856	,9057	,9489
10	108,6523	,9738	,6826	,9738	,9608
11	120,7247	,9848	,6888	,9848	,9729
12	132,7972	,9825	,7041	,9825	,9771
13	144,8697	,9730	,7140	,9730	,9709
14	156,9421	,9759	,7275	,9759	,9567
15	169,0146	,9673	,7418	,9173	,9438
16	181,0871	,9667	,7491	,9167	,9449
17	193,1596	,9769	,7502	,9769	,958[illegible]
18	205,2320	,9875	,7531	,9875	,9661
19	217,3045	,9724	,7542	,9724	,9613
20	229,3770	,9565	,7524	,9065	,9569
21	241,4495	,9845	,7542	,9845	,9623
22	253,5219	,9802	,7552	,9802	,9665
23	265,5944	,9757	,7481	,9757	,9570
24	277,6669	,9697	,7567	,9197	,9387
25	289,7393	,9679	,7592	,9179	,9238
26	301,8118	,9667	,7693	,9167	,9165
27	313,8843	,9627	,7988	,9127	,9132
28	325,9568	,9605	,9855	,9105	,9105

FIGURE 10dd SAMPLE SEPARATION SUMMARY

```
MODIFIED WBCU AT SEPARATION
K=  5      JA= 44      WBCU(K,JA)=  .1050108E+00
    J          WBCU(K,J)
   44        .1050108E+00
   45        .1124777E+00
   46        .1172831E+00
   47        .1186338E+00
   48        .1256631E+00
K=  6      JA= 43      WBCU(K,JA)=  .1070208E+00
    J          WBCU(K,J)
   43        .1070208E+00
   44        .1155211E+00
   45        .1194116E+00
   46        .1210851E+00
   47        .1270318E+00
K=  7      JA= 40      WBCU(K,JA)=  .1181560E+00
    J          WBCU(K,J)
   40        .1181560E+00
   41        .1211403E+00
   42        .1230603E+00
   43        .1179366E+00
K=  8      JA= 41      WBCU(K,JA)=  .1200048E+00
    J          WBCU(K,J)
   41        .1200048E+00
   42        .1221083E+00
   43        .1241391E+00
   44        .1470982E+00
K=  9      JA= 41      WBCU(K,JA)=  .1207668E+00
    J          WBCU(K,J)
   41        .1207668E+00
   42        .1220445E+00
   43        .1240239E+00
   44        .1597672E+00
K= 10      JA= 42      WBCU(K,JA)=  .1208251E+00
    J          WBCU(K,J)
   42        .1208251E+00
   43        .1226060E+00
   44        .1224549E+00
K= 14      JA= 41      WBCU(K,JA)=  .1085272E+00
    J          WBCU(K,J)
   41        .1085272E+00
   42        .1080102E+00
   43        .1089191E+00
   44        .9501680E-01
K= 15      JA= 41      WBCU(K,JA)=  .1048116E+00
    J          WBCU(K,J)
   41        .1048116E+00
   42        .1045604E+00
   43        .1055820E+00
   44        .1080551E+00
K= 16      JA= 41      WBCU(K,JA)=  .1014082E+00
    J          WBCU(K,J)
   41        .1014082E+00
   42        .1015729E+00
   43        .1028774E+00
   44        .1086527E+00
K= 17      JA= 41      WBCU(K,JA)=  .9843200E-01
```

FIGURE 10ee SAMPLE MODIFIED WING BOUNDARY CONDITIONS

SOLUTION DID NOT CONVERGE IN MAX ALLOWED ITERS

J	CLGG	ITER	EPS1X	EPS2X	CPUK1	CPLK1	CPUK2	CPLK2	DELUK1	DELLK1	DELUK2	DELLK2
1	.522	45	1563.48175	2190.87290	-.45110	.16753	-.18570	.43436	.00113	.01532	.00190	.02107
2	.544	45	33.38715	73.66255	-.26826	.22006	.13399	.25570	.00113	.01532	.00190	.02107

PJUMP HISTORY

IVITER K	1	2
5	.3912E+02	.4010E+02
6	.4156E+02	.4250E+02
7	.4200E+02	.4354E+02
8	.4586E+02	.4705E+02
9	.4709E+02	.4846E+02
10	.4744E+02	.4921E+02
11	.4707E+02	.4931E+02
12	.4641E+02	.4888E+02
13	.4556E+02	.4820E+02
14	.4459E+02	.4753E+02
15	.4365E+02	.4674E+02
16	.4291E+02	.4592E+02
17	.4221E+02	.4507E+02
18	.4150E+02	.4426E+02
19	.4074E+02	.4340E+02
20	.3979E+02	.4233E+02
21	.3848E+02	.4101E+02
22	.3682E+02	.3924E+02
23	.3494E+02	.3705E+02
24	.3286E+02	.3447E+02
25	.3054E+02	.3136E+02
26	.2777E+02	.2719E+02
27	.2403E+02	.2222E+02
28	.1680E+02	.1531E+02

FIGURE 10ff SAMPLE VISCOUS CONVERGENCE HISTORY

IVITER K	XSEP UPPER 1
5	.9124
6	.9205
7	.9309
8	.9403
9	.9489
10	.9608
11	.9729
12	.9771
13	.9709
14	.9567
15	.9438
16	.9449
17	.9581
18	.9661
19	.9613
20	.9569
21	.9623
22	.9665
23	.9570
24	.9387
25	.9238
26	.9165
27	.9132
28	.9105

IVITER K	XSEP LOWER 1
5	.6770
6	.6505
7	.6290
8	.6109
9	.5856
10	.6826
11	.6888
12	.7041
13	.7140
14	.7275
15	.7418
16	.7491
17	.7502
18	.7531
19	.7542
20	.7524
21	.7542
22	.7552
23	.7481
24	.7567
25	.7592
26	.7693
27	.7988
28	.9855

POTENTIAL JUMP AT TRAILING EDGE

.4010E+02 .4250E+02 .4354E+02 .4705E+02 .4846E+02 .4921E+02

FIGURE 10gg SAMPLE SEPARATION HISTORY AND TRAILING EDGE POTENTIAL JUMP

K=23 SPAN STATION ETA= ,80000 Y= 265,59440

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZBONICU	ZBONICL
2	483,0516	-,4895	,05018	,04784	,872	,873	-,002	0,000	0,000
3	504,8439	-,2838	,08119	,08294	,854	,853	,002	0,000	0,000
4	523,8158	-,1047	,16881	,17971	,801	,797	,007	0,000	0,000
5	529,1946	-,0539	,28499	,30697	,725	,710	,022	0,000	0,000
6	531,3845	-,0333	,37194	,42110	,662	,624	,049	0,000	0,000
7	532,6602	-,0212	,43581	,52183	,612	,538	,086	0,000	0,000
8	533,6227	-,0121	,49058	,62322	,566	,434	,133	0,000	0,000
9	534,4861	-,0040	,54459	,73891	,516	,269	,194	0,000	0,000
10	535,3326	,0040	,30525	,56818	,711	,493	,263	0,000	0,000
11	536,1804	,0120	-,11585	,23064	,962	,761	,346	0,000	0,000
12	537,0361	,0201	-,32213	,06402	1,064	,864	,386	4,235	0,000
13	537,9112	,0283	-,40985	-,04214	1,104	,923	,368	9,781	0,000
14	538,8226	,0369	-,47031	-,11751	1,131	,963	,353	9,781	0,000
15	539,7923	,0461	-,51773	-,17048	1,152	,990	,347	19,331	0,000
16	540,8487	,0561	-,54544	-,19825	1,164	1,004	,347	34,630	0,000
17	542,0279	,0672	-,55814	-,21289	1,169	1,011	,345	58,055	0,000
18	543,3744	,0799	-,57427	-,21858	1,176	1,018	,356	58,055	0,000
19	544,9409	,0947	-,58865	-,20906	1,182	1,009	,380	92,949	0,000
20	546,7847	,1121	-,59808	-,18837	1,186	,999	,410	92,949	0,000
21	548,9554	,1326	-,60373	-,16532	1,188	,987	,438	92,949	0,000
22	551,4739	,1564	-,60658	-,15376	1,190	,982	,453	143,385	0,000
23	554,3085	,1831	-,60672	-,15407	1,190	,982	,453	143,385	0,000
24	557,3692	,2120	-,60435	-,15490	1,189	,982	,449	143,385	0,000
25	560,5373	,2419	-,59978	-,14752	1,187	,978	,452	213,160	0,000
26	563,7123	,2719	-,59394	-,13166	1,184	,970	,462	213,160	0,000
27	566,8385	,3014	-,58820	-,11112	1,182	,960	,477	213,160	0,000
28	569,9007	,3303	-,58317	-,09093	1,180	,949	,492	213,160	0,000
29	572,9081	,3587	-,57891	-,07416	1,178	,940	,505	213,160	0,000
30	575,8792	,3867	-,57498	-,06069	1,176	,933	,514	213,160	0,000
31	578,8335	,4146	-,57103	-,04932	1,175	,927	,522	213,160	0,000
32	581,7878	,4425	-,56728	-,03855	1,173	,921	,529	213,160	0,000
33	584,7546	,4705	-,56363	-,02776	1,172	,915	,536	213,160	0,000
34	587,7429	,4987	-,55967	-,01691	1,170	,909	,543	213,160	0,000
35	590,7584	,5272	-,55531	-,00487	1,168	,903	,550	213,160	0,000
36	593,8042	,5559	-,55000	,01015	1,166	,894	,560	213,160	0,000
37	596,8814	,5850	-,54240	,03245	1,162	,882	,575	213,160	0,000
38	599,9889	,6143	-,53205	,07354	1,158	,858	,606	213,160	0,000
39	603,1240	,6439	-,51993	,15459	1,153	,810	,675	213,160	0,000
40	606,2820	,6737	-,50833	,26206	1,148	,741	,770	213,160	0,000
41	609,4550	,7037	-,50145	,36023	1,145	,671	,862	213,160	0,000
42	612,6294	,7336	-,50190	,42672	1,145	,620	,929	143,385	0,000
43	615,7832	,7634	-,51966	,45864	1,153	,594	,978	143,385	0,000
44	618,8840	,7927	-,54487	,47105	1,164	,583	1,016	92,949	0,000
45	621,8899	,8211	-,57648	,47408	1,177	,580	1,051	92,949	0,000
46	624,7565	,8481	-,62515	,47296	1,197	,581	1,098	92,949	0,000
47	627,4491	,8735	-,67630	,47276	1,219	,582	1,149	92,949	0,000
48	629,9561	,8972	-,72308	,47475	1,238	,580	1,198	92,949	0,000
49	632,2945	,9193	-,76838	,47832	1,256	,577	1,247	58,055	0,000
50	634,5049	,9401	-,79552	,48586	1,266	,570	1,281	58,055	0,000
51	636,6386	,9603	-,79409	,49220	1,266	,565	1,286	58,055	0,000
52	638,7427	,9801	-,75317	,46967	1,250	,584	1,223	58,055	0,000
53	640,8460	1,0000	-,22737	,37863	1,018	,657	,606	34,630	0,000
54	643,0081	1,0204	,28336	,30788	,726	,709	,025	0,000	0,000

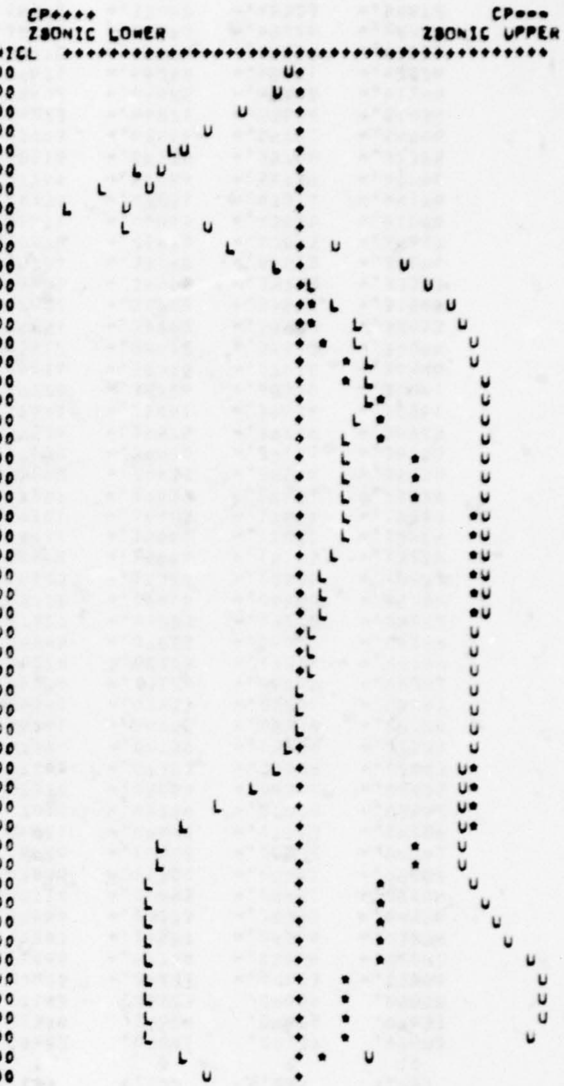

FIGURE 10hh SAMPLE PRESSURE DISTRIBUTION AND PRINT/PLOT

SIDE WALL CP DISTRIBUTION

J	ZT= X/C	-92.949 L= 1	-58.055 2	-34.630 3	-19.331 4	-9.781 5	-4.235 6	-1.133 7	1.133 8	4.235 9	9.781 10
2	-.29117	.03749	.03156	.03092	.02447	.01701	.01096	.00682	.04681	.04127	.01803
3	-.11018	.04844	.06891	.09117	.11966	.15370	.18704	.21348	.10624	.09524	.07637
4	.04739	.05118	.08585	.11671	.14711	.16715	.17275	.17143	.03135	.04514	.05508
5	.09206	.04702	.08474	.10688	.11969	.11168	.08214	.04408	-.08223	-.04003	-.00956
6	.11025	.05077	.08324	.10352	.12355	.13693	.13424	.11465	-.08754	-.05839	-.02040
7	.12084	.06027	.07795	.09586	.11680	.13028	.12448	.10367	-.11557	-.08366	-.03619
8	.12884	.07255	.07106	.08712	.10810	.11898	.10930	.08864	-.12273	-.09363	-.04578
9	.13601	.08480	.06514	.07991	.10063	.10627	.09613	.07714	-.11895	-.09421	-.05019
10	.14304	.09498	.06227	.07612	.09599	.10010	.08687	.07088	-.11300	-.09081	-.05052
11	.15008	.10217	.06360	.07684	.09502	.09552	.08202	.06926	-.10608	-.08502	-.04761
12	.15719	.10620	.06793	.08103	.09674	.09398	.08018	.06921	-.09648	-.07763	-.04228
13	.16445	.10731	.07510	.08886	.10111	.09554	.08104	.07010	-.08759	-.07009	-.03562
14	.17202	.10596	.08503	.10023	.10797	.09988	.08436	.07270	-.08054	-.06260	-.02905
15	.18008	.10269	.09486	.11157	.11460	.10405	.08725	.07465	-.07503	-.05609	-.02443
16	.18885	.09818	.10237	.11977	.11884	.10553	.08714	.07340	-.06759	-.05289	-.02354
17	.19864	.09318	.10665	.12343	.11977	.10356	.08349	.06861	-.06905	-.05533	-.02728
18	.20983	.08841	.10810	.12302	.11771	.09925	.07846	.06341	-.07557	-.06201	-.03461
19	.22284	.08431	.10785	.12035	.11391	.09460	.07474	.06094	-.08126	-.06865	-.04262
20	.23815	.08088	.10771	.11820	.11034	.09130	.07351	.06174	-.08388	-.07214	-.04799
21	.25618	.07746	.11096	.12076	.11034	.09127	.07534	.06545	-.07823	-.06827	-.04759
22	.27710	.07205	.12200	.13257	.11817	.09773	.08271	.07427	-.06023	-.05272	-.04092
23	.30064	.05739	.08279	.08748	.07429	.05672	.04435	.03775	-.07418	-.06650	-.05480
24	.32606	.03166	-.01789	-.02941	-.03700	-.04836	-.05762	-.06325	-.13326	-.12426	-.10282
25	.35237	.00760	-.06129	-.07878	-.08833	-.10031	-.11027	-.11682	-.15980	-.15173	-.13238
26	.37874	-.01197	-.06493	-.08051	-.09457	-.10929	-.12066	-.12812	-.15861	-.15230	-.13889
27	.40470	-.03680	-.11135	-.13938	-.15895	-.17675	-.18969	-.19787	-.18403	-.17638	-.15913
28	.43014	-.14859	-.30636	-.34274	-.34916	-.35617	-.36498	-.37257	-.29839	-.28673	-.25649
29	.45511	-.26182	-.47260	-.52039	-.51623	-.51577	-.52287	-.53092	-.39433	-.38546	-.35954
30	.47979	-.27264	-.43958	-.51811	-.53707	-.55233	-.56657	-.57655	-.39420	-.39101	-.38345
31	.50433	-.17986	-.29714	-.40496	-.50674	-.54255	-.56351	-.57506	-.39575	-.39249	-.38905
32	.52886	-.07181	-.12165	-.28475	-.41995	-.49698	-.54401	-.57446	-.39461	-.39044	-.38561
33	.55350	-.04675	-.06949	-.15428	-.30347	-.40977	-.46909	-.49920	-.38826	-.38320	-.37481
34	.57832	-.03676	-.07382	-.10873	-.16872	-.22760	-.25510	-.26256	-.38078	-.37448	-.36048
35	.60337	-.02206	-.02498	-.02514	-.01435	-.01027	-.01131	-.01512	-.36482	-.35812	-.34086
36	.62866	-.00233	.03248	.05913	.07992	.09486	.09838	.09651	-.34702	-.33932	-.32013
37	.65422	.01708	.06113	.08275	.09734	.10792	.11525	.12082	-.34748	-.33695	-.31545
38	.68003	.03276	.06984	.08425	.09705	.11094	.12469	.13606	-.36995	-.35702	-.33333
39	.70607	.04482	.07551	.09036	.10666	.12586	.14405	.15786	-.39798	-.38512	-.36096
40	.73229	.05429	.08506	.10561	.12786	.15223	.17352	.18876	-.41970	-.40853	-.38617
41	.75865	.06139	.09404	.12211	.15160	.18060	.20349	.21871	-.44840	-.43525	-.41090
42	.78501	.06666	.10151	.13728	.17456	.20802	.23221	.24738	-.49251	-.47374	-.44176
43	.81121	.07110	.11142	.15464	.19903	.23657	.26214	.27749	-.54065	-.51739	-.47760
44	.83696	.07504	.12185	.17161	.22237	.26415	.29183	.30816	-.58135	-.55740	-.51375
45	.86192	.07864	.13126	.18608	.24224	.28856	.31916	.33703	-.62516	-.59790	-.54966
46	.88573	.08204	.13823	.19631	.25649	.30749	.34205	.36222	-.66270	-.63536	-.58434
47	.90809	.08545	.14115	.20063	.26305	.31837	.35897	.38492	-.66985	-.65392	-.61146
48	.92891	.08936	.14583	.20513	.26562	.32130	.36592	.39671	-.66268	-.65641	-.62826
49	.94834	.09337	.15237	.21030	.26382	.31275	.35562	.38775	-.65570	-.65287	-.63652
50	.96669	.09639	.15503	.21059	.25312	.28565	.31684	.34916	-.65194	-.65016	-.64028
51	.98442	.09786	.15551	.20764	.23554	.23656	.21513	.18393	-.37047	-.48523	-.58872
52	1.00189	.09759	.15548	.20303	.21636	.18836	.12707	.05776	-.02653	-.18323	-.42691

FIGURE 10ii SAMPLE SIDE WALL CP DISTRIBUTION

58	1.29723	.05755	.14083	.19118	.22902	.25772	.27670	.28807	.29870	.30671	.29713
59	1.36948	-.14285	.08557	.09854	.10363	.11258	.12329	.13222	.78733	.76754	.36647

GRUMMAN AMES TRANSONIC VISCOUS WING BODY ANALYSIS PROGRAM

WILLIAM F. BALLHAUS (USAAMRDL)
JUANITA FRICK (INFORMATICS INC.)
NASA AMES RESEARCH CENTER
MOFFETT FIELD, CALIFORNIA

WILLIAM H. MASON
DONALD A. MACKENZIE
MARK A. STERN
AERODYNAMICS SECTION, GRUMMAN AEROSPACE CORP., BETHPAGE, NEW YORK

PROGRAM DEVELOPED FOR THE AIR FORCE FLIGHT DYNAMICS LAB, WPAFB, DAYTON OHIO

TACT

REFERENCE CHORD IS CBAR= 128.348
MOMENT ORIGIN IS X-ING = 0.000

MACH = .900 ALPHAW = 5.20 ALPHAB = 5.20

SPANWISE FORCE DISTRIBUTIONS

	Y	ETA	C/CAVE	C*CN/CAVE	C*CA/CAVE	C*CL/CAVE	C*CD/CAVE	C*CM/CAVE	CN	CA	CL	CD	CM	XCP/C	K
5	48.290	.145	1.755	.630	.047	.625	.1045	-2.595	.359	.027	.356	.0595	-.842	.773	5
6	60.362	.182	1.402	.647	.040	.644	.0991	-2.671	.404	.025	.402	.0619	-1.041	.735	6
7	72.435	.218	1.448	.645	.034	.642	.0927	-2.690	.445	.024	.443	.0640	-1.282	.718	7
8	84.507	.255	1.295	.699	.036	.695	.0997	-2.965	.539	.028	.537	.0770	-1.768	.723	8
9	96.580	.291	1.142	.722	.025	.720	.0904	-3.099	.632	.022	.630	.0792	-2.378	.701	9
10	108.652	.327	1.101	.740	-.003	.740	.0643	-3.186	.672	-.003	.672	.0584	-2.631	.668	10
11	120.725	.364	1.079	.744	-.004	.744	.0634	-3.223	.689	-.004	.689	.0588	-2.766	.662	11
12	132.797	.400	1.058	.739	-.008	.740	.0591	-3.221	.698	-.007	.699	.0559	-2.876	.654	12
13	144.870	.436	1.037	.730	-.012	.731	.0547	-3.199	.704	-.011	.705	.0528	-2.975	.644	13
14	156.942	.473	1.016	.720	-.014	.721	.0512	-3.174	.709	-.014	.710	.0504	-3.076	.636	14
15	169.015	.509	.995	.708	-.016	.710	.0481	-3.142	.712	-.016	.714	.0484	-3.176	.629	15
16	181.087	.545	.974	.696	-.018	.698	.0453	-3.108	.715	-.018	.717	.0465	-3.279	.624	16
17	193.160	.582	.952	.683	-.020	.685	.0424	-3.071	.718	-.021	.720	.0445	-3.386	.619	17
18	205.232	.618	.931	.671	-.021	.673	.0397	-3.037	.721	-.023	.723	.0426	-3.502	.616	18
19	217.305	.655	.910	.658	-.023	.660	.0368	-2.998	.723	-.025	.725	.0404	-3.620	.613	19
20	229.377	.691	.889	.642	-.025	.644	.0334	-2.944	.722	-.028	.725	.0375	-3.727	.608	20
21	241.449	.727	.868	.622	-.027	.624	.0293	-2.870	.716	-.031	.719	.0338	-3.812	.603	21
22	253.522	.764	.847	.594	-.029	.597	.0249	-2.762	.702	-.034	.705	.0294	-3.854	.596	22
23	265.594	.800	.825	.561	-.030	.564	.0206	-2.623	.680	-.037	.683	.0250	-3.850	.588	23
24	277.667	.836	.804	.522	-.031	.525	.0163	-2.455	.649	-.039	.652	.0203	-3.796	.580	24
25	289.739	.873	.783	.475	-.031	.478	.0118	-2.247	.606	-.040	.610	.0150	-3.665	.571	25
26	301.812	.909	.762	.412	-.032	.415	.0057	-1.961	.541	-.042	.544	.0075	-3.378	.555	26
27	313.884	.945	.741	.335	-.031	.337	-.0002	-1.602	.452	-.041	.455	-.0002	-2.919	.536	27
28	325.957	.982	.720	.228	-.026	.231	-.0055	-1.100	.317	-.036	.321	-.0076	-2.124	.512	28

TOTAL FORCE COEFFICIENTS

(BASED ON SREF)

SREF=42610.604 STRUE=49428.491 SEXPUSED=36649.008
AR REF= 5.173 AR TRUE= 4.460

CN = .52356 XCP= 570.7858 YCP= 187.5089

CA = -.00826 CDF= 225.6564(UPPER)

CM = -2.33171 CDF= 132.7912(LOWER)

CL = .52431 (SURFACE PRESSURE INTEGRATION) CDF= 358.4476(TOTAL)
.54427 (CIRCULATION)

CD(P+I)= .0393
CD = 358.48685 CB = .059 (UNSWEPT ROOT BENDING-MOMENT)

FIGURE 10jj SAMPLE FINAL FORCE AND MOMENT SUMMARY

```
K= 16
CPL(K,J),J=1,NX
  .86672225E+00   .33734592E+00   .10188138E+00  -.35308604E-01  -.12384976E+00
 -.17941330E+00  -.20504190E+00  -.22692666E+00  -.24609018E+00  -.25389410E+00
 -.25102507E+00  -.22647649E+00  -.20288684E+00  -.19950447E+00  -.19978290E+00
 -.18696801E+00  -.16663980E+00  -.14655570E+00  -.13136300E+00  -.11996539E+00
 -.10898904E+00  -.98187628E-01  -.87552728E-01  -.76621286E-01  -.65592510E-01
 -.56372535E-01  -.46031995E-01  -.24746549E-01   .24861912E-01   .11068728E+00
  .21944639E+00   .32431632E+00   .40013093E+00   .43999601E+00   .45172761E+00
  .45191787E+00   .46894786E+00   .51483369E+00   .56767828E+00   .61005073E+00
  .62477129E+00   .59874283E+00   .49873792E+00   .10331936E+00

K= 17
CPL(K,J),J=1,NX
  .85334071E+00   .34000985E+00   .11161453E+00  -.20981868E-01  -.10588478E+00
 -.15862568E+00  -.18267228E+00  -.20320133E+00  -.22283872E+00  -.23402292E+00
 -.23640312E+00  -.21820178E+00  -.19756406E+00  -.19207648E+00  -.18893997E+00
 -.17428495E+00  -.15366447E+00  -.13403778E+00  -.11977596E+00  -.10993998E+00
 -.10092301E+00  -.92096855E-01  -.83206485E-01  -.73787353E-01  -.64468466E-01
 -.56336583E-01  -.47426036E-01  -.28862502E-01   .17701344E-01   .10091938E+00
  .20968826E+00   .31728042E+00   .39413876E+00   .43391082E+00   .44676544E+00
  .44983744E+00   .46519550E+00   .50785213E+00   .56125148E+00   .60283991E+00
  .61750186E+00   .59239677E+00   .49911273E+00   .11405102E+00

K= 18
CPL(K,J),J=1,NX
  .83958528E+00   .34238259E+00   .12061441E+00  -.83178523E-02  -.91137523E-01
 -.14326357E+00  -.16747680E+00  -.18790603E+00  -.20857784E+00  -.22313901E+00
 -.22867958E+00  -.21127994E+00  -.19037813E+00  -.18334120E+00  -.17795313E+00
 -.16280821E+00  -.14309262E+00  -.12480891E+00  -.11198167E+00  -.10363896E+00
 -.96101865E-01  -.88651689E-01  -.80788855E-01  -.72100653E-01  -.63393970E-01
 -.55908885E-01  -.47445909E-01  -.29735604E-01   .14548218E-01   .95263498E-01
  .20371378E+00   .31364469E+00   .39317595E+00   .43406614E+00   .44861625E+00
  .45249557E+00   .46522234E+00   .50224321E+00   .55210104E+00   .59481290E+00
  .61326153E+00   .59330461E+00   .49713533E+00   .12737205E+00

K= 19
CPL(K,J),J=1,NX
  .82400968E+00   .34243442E+00   .12656057E+00   .41337407E-03  -.81294623E-01
 -.13359012E+00  -.15830055E+00  -.17908175E+00  -.20058934E+00  -.21538019E+00
 -.22058613E+00  -.20350933E+00  -.18280695E+00  -.17470686E+00  -.16827217E+00
 -.15369101E+00  -.13545889E+00  -.11884994E+00  -.10735808E+00  -.10006420E+00
 -.93328886E-01  -.86324329E-01  -.78715141E-01  -.70351738E-01  -.62216264E-01
 -.54830000E-01  -.45811627E-01  -.27700311E-01   .14823947E-01   .92969306E-01
  .20164522E+00   .31357618E+00   .39369822E+00   .43535389E+00   .45055372E+00
  .45465859E+00   .46667657E+00   .50066945E+00   .54743203E+00   .58918334E+00
  .61026006E+00   .59440558E+00   .50074239E+00   .16322252E+00

K= 20
CPL(K,J),J=1,NX
  .80570505E+00   .33922333E+00   .12878224E+00   .50846357E-02  -.75707226E-01
```

FIGURE 10kk SAMPLE SAVED SOLUTION OUTPUT

```
BOUNDARY LAYER CALCULATION AT STRIP -11 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  20.57

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      .689

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  12 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  20.57

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      .982

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -12 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  20.57

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      .704

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  13 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  20.57

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      .973

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -13 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  20.57

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      .714

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  14 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  20.57

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      .976

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -14 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  20.57

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      .727

B.L. CALC. TERMINATES AT THIS POINT
```

FIGURE 1011 SAMPLE BOUNDARY LAYER CALCULATION OUTPUT WITH FLWRIT=1

NEW DISPLACEMENT THICKNESS
AT STATION 10

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	.004	.3238E-04	.2269E-03	.5795E-04	-.2225E-03	-.6710E+00	-.7536E+00
2	.012	.4308E-04	.1153E-02	.6176E-04	.6819E-03	-.2968E+00	-.3227E+00
3	.020	.6375E-04	.1918E-02	.7237E-04	.5504E-03	-.1991E+00	-.2290E+00
4	.028	.9820E-04	.3081E-02	.8291E-04	.8904E-03	-.1490E+00	-.1848E+00
5	.037	.1495E-03	.4239E-02	.9638E-04	.9412E-03	-.1168E+00	-.1556E+00
6	.046	.2450E-03	.1025E-01	.1092E-03	.6830E-03	-.9702E-01	-.1324E+00
7	.056	.1676E-03	-.8973E-02	.1028E-03	-.1096E-02	-.7750E-01	-.1144E+00
8	.067	.1852E-03	.4158E-02	.1258E-03	.1678E-02	-.7093E-01	-.1003E+00
9	.080	.2444E-03	.3318E-02	.1527E-03	.1279E-02	-.5683E-01	-.8638E-01
10	.095	.3215E-03	.2977E-02	.1869E-03	.1742E-02	-.4358E-01	-.7301E-01
11	.112	.3990E-03	.2445E-02	.2172E-03	.1352E-02	-.3345E-01	-.5880E-01
12	.133	.4907E-03	.2623E-02	.2665E-03	.6624E-03	-.2461E-01	-.4683E-01
13	.156	.5903E-03	.2618E-02	.3257E-03	.1162E-02	-.1701E-01	-.4039E-01
14	.183	.6892E-03	.2287E-02	.3995E-03	.1488E-02	-.1039E-01	-.3575E-01
15	.212	.7804E-03	.1797E-02	.4841E-03	.1672E-02	-.4483E-02	-.2882E-01
16	.242	.8624E-03	.1597E-02	.5755E-03	.1926E-02	.2599E-03	-.2237E-01
17	.272	.9427E-03	.1592E-02	.6702E-03	.1948E-02	.3821E-02	-.1778E-01
18	.301	.1018E-02	.1616E-02	.7630E-03	.1842E-02	.6807E-02	-.1473E-01
19	.330	.1089E-02	.1482E-02	.8549E-03	.1871E-02	.9638E-02	-.1251E-01
20	.359	.1159E-02	.1445E-02	.9504E-03	.2031E-02	.1276E-01	-.9624E-02
21	.387	.1231E-02	.1520E-02	.1051E-02	.2092E-02	.1577E-01	-.6182E-02
22	.415	.1305E-02	.1601E-02	.1168E-02	.2581E-02	.1834E-01	-.2612E-02
23	.443	.1382E-02	.1697E-02	.1298E-02	.3121E-02	.2058E-01	.1451E-02
24	.471	.1458E-02	.1765E-02	.1450E-02	.3563E-02	.2256E-01	.6125E-02
25	.499	.1536E-02	.1547E-02	.1631E-02	.4212E-02	.2459E-01	.1078E-01
26	.527	.1607E-02	.1507E-02	.1843E-02	.4961E-02	.2657E-01	.1597E-01
27	.556	.1672E-02	.1315E-02	.2842E-02	-.1961E-01	.2884E-01	.3389E-01
28	.585	.1728E-02	.9866E-03	.2390E-02	.5546E-02	.3128E-01	.3661E-01
29	.614	.1769E-02	.4061E-03	.3029E-02	.2714E-01	.3377E-01	.4518E-01
30	.644	.1795E-02	.9345E-04	.4570E-02	.4571E-01	.3699E-01	.5199E-01
31	.674	.1812E-02	.1584E-03	.6807E-02	.6323E-01	.4131E-01	.5151E-01
32	.704	.1832E-02	.1720E-03	.9516E-02	.7307E-01	.4688E-01	.4560E-01
33	.734	.1840E-02	-.3362E-04	.1246E-01	.7540E-01	.5246E-01	.3634E-01
34	.763	.1839E-02	-.6312E-04	.1538E-01	.7313E-01	.5699E-01	.2622E-01
35	.793	.1831E-02	-.1168E-03	.1804E-01	.6643E-01	.6670E-01	.1652E-01
36	.821	.1818E-02	-.4462E-03	.2020E-01	.5572E-01	.7662E-01	.6313E-02
37	.848	.1802E-02	.8767E-04	.2171E-01	.4162E-01	.8792E-01	-.3598E-02
38	.874	.1825E-02	.1758E-03	.2246E-01	.2493E-01	.9896E-01	-.1407E-01
39	.897	.1812E-02	.9434E-03	.2247E-01	.6399E-02	.1022E+00	-.2471E-01
40	.919	.1921E-02	.1209E-02	.2177E-01	-.1350E-01	.1088E+00	-.3734E-01
41	.940	.1757E-02	-.3867E-02	.2040E-01	-.3462E-01	.1203E+00	-.5324E-01
42	.960	.2272E-02	.3792E-01	.1833E-01	-.5714E-01	.1208E+00	-.6868E-01
43	.980	.4054E-02	.6120E-01	.1553E-01	-.8141E-01	.1208E+00	-.9464E-01
44	1.000	.6079E-02	.8448E-01	.1189E-01	-.1077E+00	.1208E+00	-.1210E+00

FIGURE 10mm SAMPLE BOUNDARY LAYER SUMMARY WITH FLWRIT=1

b. Description of Internally Generated Messages & User Response

There are a number of "failsafes" built into the program to check for obvious problems that would cause the program to fail. A list of the problems, the associated program response, program action, and required user correction follows in Table III. These failsafes are intended to check for obvious input errors and, if necessary, warn of insufficient progress toward a solution. As shown on Table III, some of the input errors, primarily geometry errors, will cause the program to stop execution and require the user to correct the errors before resubmitting the job. Other errors will generally cause a warning to be printed along with a statement of whatever action the program took to counteract the error. Execution in these cases continues. It should be noted that the program has a certain priority scheme for handling problems; for instance, the IDISK clue will override the REMESH clue if there is a conflict. If the REMESH option was the one actually desired, the code will fail. Although the internal checking will ensure that the most obvious errors will be corrected before a long computer run, the user should continue to exercise care in the construction of data sets.

TABLE III

INTERNALLY GENERATED DIAGNOSTIC MESSAGES

PROBLEM	PROGRAM RESPONSE	PROGRAM ACTION	USER CORRECTION
1. Number of input airfoil sections > 11	Too many airfoil sections input. Number of sections must be less than 11.	Program Stops	Reduce number of sections to less than 12 and resubmit job.
2. Number of input airfoil ordinates per section greater than 90/surface.	Too many airfoil ordinates at section -- Input Number must be less than 91/surface.	Program Stops	Reduce number of ordinates to less than 91/surface and resubmit job.
3. Number of input wing twists greater than 11.	Too many wing twists input. Number of twists must be 11 or less.	Program Stops	Reduce number of twists to 11 or less and resubmit job.
4. Number of leading edge planform pairs greater than 10.	Too many L.E. planform pairs. Reduce number to 10 or less.	Program Stops	Reduce number of pairs to 10 or less and resubmit job.
5. Number of trailing edge planform pairs greater than 10.	Too many T.E. planform pairs. Reduce number to 10 or less.	Program Stops	Reduce number of pairs to 10 or less and resubmit job.
6. Gaps in planform.	Gaps in wing L.E. or T.E. planform. Check wing planform coordinates.	Program Stops	Correct wing planform and resubmit job.
7. Number of streamwise body slopes greater than 90.	Too many streamwise body slopes or coordinate input. Reduce number to 90 or less.	Program Stops	Reduce number and resubmit job.
8. Number of top and/or bottom body span locations greater than 10.	Too many body span locations input. Reduce number to 10 or less/surface.	Program Stops	Reduce number and resubmit job.
9. Number of body side wall locations greater than 20.	Too many body side wall locations input. Reduce number to 20 or less.	Program Stops	Reduce number and resubmit job.
10. Internally generated fine mesh too large.	Interior fine mesh or initial mesh too large. Alter input mesh parameters.	Program Stops	Alter fine mesh input parameter to reduce size of grid and resubmit job.
11. User input crude mesh too large.	Input crude mesh too large. Reduce size.	Program Stops	Reduce size of mesh and resubmit.
12. User input fine mesh too large.	Input fine mesh too large. Reduce size.	Program Stops	Reduce size of mesh and resubmit.
13. Number of viscous-inviscid iterations > 20	Number of viscous-inviscid iterations too large, FIVSMX reset to 20.	FIVSMX reset to 20, Program Continues	None
14. RSUB not in correct range.	RSUB outside range of 0 to 2. Reset to default value.	RSUB reset to 1.7, Program Continues	None

TABLE III (Continued)

PROBLEM	PROGRAM RESPONSE	PROGRAM ACTION	USER CORRECTION
15. RSUBX not in correct range.	RSUBX outside range of 0 to 2. Reset to default value.	RSUBX reset to 1.6, Program Continues	None
16. RSUBI not in correct range.	RSUBI outside range of 0 to 2. Reset to default value.	RSUBI reset to 1.6, Program Continues	None
17. EPS less than zero.	EPS less than zero. Reset to default value.	EPS reset to 1., Program Continues	None
18. EPSEX less than zero.	EPSEX less than zero. Reset to default value.	EPSEX reset to 1., Program Continues	None
19. EMEXP(1) and/or EMEXP(2) input at other than default values.	EMEXP(1) and/or EMEXP(2) changed from default values. Check input values for correctness.	None	None
20. RFACT outside required range.	RFACT outside range of 0 to 1. RFACT reset to default value.	RFACT reset to 0., Program Continues	None
21. Mach number outside required range.	Mach number outside range of 0 to 1., SOLV reset to false.	Program stops after processing geometry.	Correct Mach number and resubmit.
22. γ input at other than default value.	GAMMA changed from default value. Check value for correctness.	None	None
23. Wing off body.	Wing water line not on body. Input correct value.	Program Stops	Input correct value and resubmit.
24. CL not changing in inviscid solution ($\Delta C_L < 10^{-4}$ over 10 iters.)	CL effectively constant. Inviscid solution halts.	1. If IVISC=F, solution halts and program proceeds to final output results. 2. If IVISC=T, inviscid solution halts and program proceeds to next viscous iteration.	None
25. Solution diverging (max error > 10^2)	Inviscid solution diverging, inviscid solution halts.	1. If IVISC=F, program stops. 2. If IVISC=T, inviscid solution halts and program proceeds to next viscous iteration.	Check input geometry and relaxation parameters. If necessary input special meshes and/or mappings.

TABLE III (Continued)

PROBLEM	PROGRAM RESPONSE	PROGRAM ACTION	USER CORRECTION
26. Input Re low (< 100,000)	Warning: Input Reynold's Number may be too low, check value.	None	None
27. ISPAN = F and BODY = T	Warning: Input ISPAN and BODY clues are incompatible. ISPAN reset to true.	ISPAN set true, Program Continues	None
28. YAW = T and BODY = T	Warning: Input YAW and BODY clues are incompatible. YAWED wing option can only be run for an isolated wing.	Program Stops	Reset either YAW or BODY to false.
29. AREA = T and AXISYM = F	Warning: AREA and AXISYM clues are incompatible. AXISYM reset to true.	AXISYM set true, Program Continues	None
30. IDISK = T, MSHINT = F, IVISC = T from a viscous solution.	Warning: MSHINT = F is incompatible with viscous saved solution. MSHINT reset to true.	MSHINT set true, Program Continues	None
31. YAW = T, SWEEP too large (> 90°).	Sweep angle too large for yawed wing option.	Program Stops	Correct sweep angle and resubmit.
32. REMESH = T and IDISK = T	Warning: Input REMESH and IDISK clues are incompatible. REMESH reset to false.	REMESH set to false, Program Continues	None
33. Number of crude mesh points on wing < 3.	There are less than 3 crude mesh points on wing at span station.	Program Stops	Input new coarse grid making sure there are at least 3 grid points at each span station.
34. Number of vertical crude grid points on body less than 2.	There are less than 2 vertical crude grid mesh points on the body.	Program Stops	Input new crude grid.
35. Number of Y crude grid points on body less than 2.	There are less than 2 Y crude grid mesh points on the body.	Program Stops	Input new crude grid.
36. Input body slopes do not "cover" body.	Input body slopes do not cover body.	Program Stops	Input additional body slopes.
37. EPSI less than zero.	EPSI less than zero, reset to default value.	EPSI reset to 1., Program continues	None

TABLE III (Concluded)

PROBLEM	PROGRAM RESPONSE	PROGRAM ACTION	USER CORRECTION
38. Plot run has no saved solution available.	Null calculation, MAXIT = 0 and IDISK = F.	Program Stops	Input IDISK = T
39. Number of input mapping segments too large.	Number of input LE/TE mapping segments is greater than 12. Reduce number of segments.	Program Stops	Reduce number and resubmit job.
40. Number of input points defining mapping segment too large.	Too many input points on mapping segment N. Number of points must be 10 or less.	Program Stops	Reduce number and resubmit job.

5. JOB CONTROL LANGUAGE

a. General

The exact Job Control Language (JCL) required to execute the program will vary from installation to installation. We have included examples of IBM JCL for the WPAFB ASD IBM 370/155 computer and CDC JCL for the NASA Ames CDC 7600. The JCL will also depend on the different modes of operation. These include operating from either a source deck or Load Module and starting the solution from scratch or from a previously generated solution. The source code will typically be stored on tape or disk due to its relatively large size (6 boxes of cards). IBM JCL is emphasized due to its relatively elaborate requirements. For IBM execution, the program requires compilation on the H-extended compiler using the OPT = 2 option. About 1400K of core storage is required for execution. Information for estimating the running time of a particular submission on a specific machine was included in Section II.

b. Sample JCL

In this section, we include examples of JCL for:

(1) Compile-Load-Go

(2) Execution From a Load Module

(3) Generation of An H-Extended Load Module

(4) I/O JCL

(5) CDC Update Execution

These are intended to provide guidelines for the typical user, while he develops his own style of operation.

(1) Fortran Compile-Load-Go

This JCL deck is set up for an IBM FORTH, OPT = 0 compilation using the ASD FORTHCLG catalogued procedure. It is assumed that the source deck is stored on disk. Testing at ASD (September 1977) has shown that OPT = 2 generates improper code on the H-compiler. There is a factor of 2.5 in execution CPU time between OPT = 2 and OPT = 0, so that OPT = 0 is not recommended for production runs.

```
//GRUM1501 JOB (7278,136,0500,0030,0000,,2,,62),'MACKENZIE-575-5722',   X
//     MSGLEVEL=1,CLASS=7,REGION=1500K,TIME=410
/*MESSAGE  CPU TIME 410 MIN, WALL CLOCK 500 MIN, REGION 1500K
//AMES EXEC FORTHCLG,PARM.FORT='OPT=0',REGION.FORT=400K,TIME.FORT=10,   X
//     PARM.LKED='SIZE=(110K,28K),MAP,LET,LIST',                        X
//     REGION.GO=1500K,TIME.GO=400
//FORT.SYSLIN DD DSN=&&LOADSET,DISP=(,PASS),                            X
//     UNIT=(SYSDA,SEP=SYSPRINT),SPACE=(CYL,(4,1)),                      X
//     DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)
//FORT.SYSIN DD DISP=SHR,DSN=D770278.MASON.GACAMES.CY51.CARDS,          X
//     UNIT=3330,VOL=SER=OSPF02
//LKED.SYSIN DD *
 ENTRY MAIN
/*
//GO.FT06F001 DD SYSOUT=A,SPACE=(3520,(500,50),,,ROUND),                X
//     UNIT=(SYSDA,SEP=FT05F001),                                        X
//     DCB=(RECFM=FBSA,LRECL=133,BLKSIZE=3458)
//GO.FT10F001 DD DUMMY
//FT11F001 DD DISP=(,KEEP),DSN=D770278.MASON.F8.CY51.I100,              X
//     UNIT=3330,VOL=SER=OSPF02,                                         X
//     SPACE=(TRK,(80,5)),                                               X
//     DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
//GO.FT12F001 DD UNIT=SYSDA,                                            X
//     SPACE=(CYL,(5)),                                                  X
//     DCB=(RECFM=VBS,LRECL=2404,BLKSIZE=2408,BUFNO=2,OPTCD=CZ)
//GO.FT13F001 DD DUMMY
//GO.SYSUDUMP DD SYSOUT=A
//GO.SYSIN DD *
   (CARD INPUT GOES HERE)
/*
```

In this JCL, the source deck is stored on 3330 disk OSPF02 and has the name D770278. MASON.GACAMES.CY5.CARDS. The solution starts from scratch and provision is made to store the solution on the same 3330 disk, with the name F8.CY51.I100. The data sets are saved in a formatted form in the program in order to allow for the same saved solution to be used on both IBM and CDC equipment.

The CPU time allocated for this job is for 100 cycles on the initial grid (REMESH = T) and 100 cycles on the fine grid with EXTMSH = T on the ASD 370/155 computer. More cycles will normally be required for convergence so that the ISAVE = T option is recommended. The wall time is arbitrarily set to 100 minutes more than the CPU time. The wall time/CPU time ratio is strongly dependent by the environment in which the job is executing and can vary from 1/1 for a stand-alone job to 10/1 with other jobs executing simultaneously.

The following I/O units are used in the GO step:

FT05F001 (SYSIN) - unit 5 is used for card input.

FT06F001 - unit 6 is used for printed output. Space has been allocated for 30,000 lines.

FT10F001 - unit 10 is used when starting from a saved solution (IDISK = T)

FT11F001 - unit 11 is for saving the solution from the current run (ISAVE = T). In this JCL deck, the solution is saved on disk.

FT12F001 - unit 12 is a scratch disk data set used for interpolating between meshes and is required (if MSHINT = T or REMESH = T - normal operation).

FT13F001 - unit 13 is used for generating an input data set for the Nash 3-D boundary layer program (IBLOUT = T).

(2) Execution From a Load Module

This JCL deck is set up to execute from an OPT = 2 Fortran H-extended load module. Again, the CPU time allocated for this job is for 100 cycles on the initial grid and 100 cycles on the fine grid. The comments above on the ratio of wall time/CPU time still apply.

```
//GRUM1454 JOB (7278,136,0250,0030,0000,,2,,62),'MACKENZIE-575-5722',  X
//     MSGLEVEL=1,CLASS=Z,REGION=1400K,TIME=150
/*MESSAGE  CPU TIME 150 MIN, WALL CLOCK 250 MIN, REGION 1400K
//GACAMES EXEC PGM=OPT2MOD,REGION=1400K,TIME=150
//STEPLIB DD DISP=SHR,DSN=D770278.MASON.GACAMES.CYS1.FORTXMOD,         X
//     UNIT=3330,VOL=SER=OSPF02
//FT05F001 DD DDNAME=SYSIN
//FT06F001 DD SYSOUT=A,SPACE=(3520,(500,50),,,ROUND),                   X
//     UNIT=(SYSDA,SEP=FT05F001),                                       X
//     DCB=(RECFM=FBSA,LRECL=133,BLKSIZE=3458)
//FT10F001 DD DUMMY
//FT11F001 DD DISP=(,KEEP),DSN=D770278.MASON.FB.CYS1.I100,              X
//     UNIT=3330,VOL=SER=OSPF02,                                        X
//     SPACE=(TRK,(80,5)),                                              X
//     DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
//FT12F001 DD UNIT=SYSDA,                                               X
//     SPACE=(CYL,(5)),                                                 X
//     DCB=(RECFM=VBS,LRECL=2404,BLKSIZE=2408,BUFNO=2,OPTCD=CZ)
//FT13F001 DD DUMMY
//SYSUDUMP DD SYSOUT=A
//SYSIN DD *
    (CARD INPUT GOES HERE)
/*
```

(3) Generation of a Fortran H-Extended Load Module

This JCL deck is set up to generate a Fortran H-extended Load Module when the compiler and supporting Fortran library are available. It is assumed that a FORTXCL catalogued procedure similar to the FORTHCL catalogued procedure is available. The partitioned data set containing the load module is stored on disk.

```
//GRUM0001 JOB (7278,136,0050,0030,0000,,2,,62),'MACKENZIE-575-5722',   X
//     MSGLEVEL=1,CLASS=C,REGION=320K,TIME=10
/*MESSAGE  CPU TIME  10 MIN. WALL CLOCK  50 MIN. REGION  320K
//AMES EXEC FORTXCL,PARM.FORT='OPT(2)',REGION.FORT=320K,TIME.FORT=10,   X
//     PARM.LKED='SIZE=(110K,28K),MAP,LET,LIST'
//FORT.SYSLIN DD DSN=&&LOADSET,DISP=(,PASS),                            X
//     UNIT=(SYSDA,SEP=SYSPRINT),SPACE=(CYL,(4,1)),                     X
//     DCB=(RECFM=FB,LRECL=80,BLKSIZE=3200)
//FORT.SYSIN DD DISP=(OLD,KEEP),DSN=GACAMES.CY51.CARDS
//LKED.SYSLMOD DD DISP=(,KEEP),DSN=GACAMES.CY51.FORTXMOD(OPT2MOD),      X
//     UNIT=3330,VOL=SER=OSPF02,                                        X
//     SPACE=(TRK,(40,5,5))
//LKED.SYSIN DD *
  ENTRY MAIN
/*
```

(4) I/O JCL*

To save a solution on tape, the FT11F001 DD statement above is replaced by the following:

```
//FT11F001 DD DISP=OLD,DSN=F8.CY51.I100,                                X
//     UNIT=(TAPE,,DEFER),VOL=SER=N01101,                               X
//     LABEL=(1,SL),                                                    X
//     DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120,DEN=3)
```

Note that an additional message card should be inserted in the deck after the first message card:

```
/*MESSAGE  THIS JOB WILL REQUIRE TAPE N01101 WITH WRITE RING
```

To retrieve a previously saved solution from disk, the FT10F001 DD statement is replaced by the following:

```
//FT10F001 DD DISP=(OLD,KEEP),DSN=D770278.MASON.F8.CY51.I100,           X
//     UNIT=3330,VOL=SER=OSPF02
```

---

* The DDNAMES for these DD statements should be //GO.FTXXF001 for a Compile-Load-Go execution and //FTXXF001 for execution from a load module.

To retrieve a previously saved solution from tape, the FT10F001 DD statement is replaced by the following:

```
//FT10F001 DD DISP=OLD,DSN=FB.CYS1.1100,                               X
//      UNIT=(TAPE,,DEFER),VOL=SER=ND1101,                             X
//      LABEL=(1,SL)
```

Again, an additional message card should be inserted in the JCL deck:

```
/*MESSAGE  THIS JOB WILL REQUIRE TAPE ND1101 NO RING
```

If an input data set for the Nash 3-D boundary layer program is desired (IBLOUT = T), the following JCL cards replace the FT13F001 DD statement.

To generate a punched deck:

```
//FT13F001 DD SYSOUT=B
```

To save the data on disk:

```
//FT13F001 DD DISP=(,KEEP),DSN=D770278.MASON.NASHDATA,                 X
//      UNIT=3330,VOL=SER=OSPF02,                                      X
//      SPACE=(TRK,(1,1)),                                             X
//      DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
```

To save the data on tape:

```
//FT13F001 DD DISP=OLD,DSN=NASHDATA,                                   X
//      UNIT=(TAPE,,DEFER),VOL=SER=ND1102,                             X
//      LABEL=(1,SL),                                                  X
//      DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120,DEN=3)
```

with an appropriate message card inserted in the deck.

If the Nash program is going to be run as a subsequent step in the same job:

```
//FT13F001 DD DISP=(,PASS),DSN=&&NASHDATA,                             X
//      UNIT=SYSDA,                                                    X
//      SPACE=(TRK,(1,1)),                                             X
//      DCB=(RECFM=FB,LRECL=80,BLKSIZE=3120)
```

The GO.SYSIN DD statement in the NASH JCL deck would be replaced by the following:

```
//GO.SYSIN DD DISP=(OLD.DELETE).DSN=&&NASHDATA
```

(5) CDC Update Execution

This JCL deck provides an example of the CDC JCL corresponding to the job described previously in Section (1) and (2). The appropriate CDC operation assumes that the source code is stored on the systems disk in update format. The JCL is set up to save the solution on a mountable disk pack. The update cards indicated in the JCL are only required if the code is being modified.

```
GAC96.T250.PN.YD1.                                  MACKENZIE..GRUMMAN..516-LR5-3671    029
ACCOUNT.STTGRUM.[redacted]
MOUNT.VSN=[redacted].SN=STTFRB3.
REQUEST.TAPE11.*PF.SN=STTFRB3.
ATTACH.OLDPL.GACBOPPE.CY=5.ID=STTGRUM.
UPDATE.F.
RETURN.OLDPL.
RFL.160000.
FTN.I.LCM=I.OPT=2.R=0.
RETURN.COMPILE.
LGO.PL=99999.
CATALOG.TAPE11.FBCY511100.ID=STTGRUM.SN=STTFRB3.
789 CARD
    (UPDATE CARDS GO HERE)
789 CARD
    (CARD INPUT GOES HERE)
6789 CARD
```

6. SAMPLE CASE

A complete output of the run resulting from the input data set shown in Figure 9b, the RAE Wing "A", configuration is included in this report. The execution was made on the Grumman IBM 370/168, with a running time of 22 CPU minutes. This sample demonstrates the REMESH option, as well as the viscous interaction option. The result converged quickly because the lift change test was set at 5 times its basic value in order to provide a shortened output. The underflows appearing in SOLV at the initiation of the REMESH iteration are typical of the solution on IBM machines, where the initial iteration may lead to products of small numbers which are under the allowable size. These errors have no effect on the final results and the user should not be unduly concerned if they appear at the initial stages of the inviscid iteration.

In the viscous part of the solution, notice that the interaction moves the separation point aft and that, as we might expect for this case, there is only minor separation predicted. The occurrence of local separation does, however, demonstrate that in any fully coupled program some treatment of flow separation is required.

For this particular case, the final C_L and C_D did not print on the special output paper and the user should consult the force page after the REMESH option for a typical result.

```
GRUMMAN AMES TRANSONIC VISCOUS WING BODY ANALYSIS PROGRAM

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     JUANITA FRICK (INFORMATICS INC.)           DONALD A. MACKENZIE
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     MOFFETT FIELD, CALIFORNIA                  AERODYNAMICS SECTION, GRUMMAN AEROSPACE CORP., BETHPAGE, NEW YORK

PROGRAM DEVELOPED FOR THE AIR FORCE FLIGHT DYNAMICS LAB, WPAFB, DAYTON OHIO

INPUT DATA

 RAE WING BODY CONFIGURATION

IDISK     MSHINT    ISAVE     IPLOT     SOLV      WBCPRT    BBCPRT    BODY      FCR       ISPAN     EXTMSH    REMESH
 F         F         T         T         T         T         T         F         T         T         T         T

YAW       IFINR     ICRUDR    IMAPR     IBUMP     IVISC     ITWIST    IFOILT    IBODIN    AXISYM    AREA      IBLOUT
 F         F         F         F         F         T         F         F         F         F         F         F

JMESHR    JMAPR
 F         F

FLIGHT CONDITIONS

MACHNO    ALPHAW    ALPHAB    GAMMA     RFACT     EMEXP(1)  EMEXP(2)
0.9100    1.0000    1.0000    1.4000    0.0        1.7500   -0.2500

INITIAL MESH RELAXATION PARAMETERS

FMXITI    FINCRI    RSUBI     RTESTI     EPSI
 100.        1.     1.600   0.100E-03   1.00

INITIAL MESH GENERATION PARAMETERS

DXLI      DXTI      DXMXI     FNFI      FNBI      XDSTI     XLGI      FIOUT1    FIOUT2
0.0200    0.0400    0.0750    12.       10.       11.00      5.00      0.         0.

FINE MESH RELAXATION PARAMETERS

FMAXIT    FINCR     RSUB      RTEST      EPS
  50.        1.     1.700   0.100E-04   1.00

FINE MESH GENERATION PARAMETERS

DXL       DXT       DXMX      FNF       FNB       XDST      XLG       FIOUT1    FIOUT2
0.0080    0.0200    0.0300    8.        8.         1.88      0.44      0.        0.

COARSE MESH RELAXATION PARAMETERS

FMXITN    FMXITX    FINCRX    RSUBX      EPSEX
   1.        1.        1.     1.600      1.00

VISCOUS ITERATION PARAMETERS

FIVSMX    FIVCON    EPSVIS    RE        FIOUTP    FISTEP    FITRNS    XTRNT     XTRNB     CHISWP
  4.        2.      0.0100    10.000      0.       10.       -4.      0.050     0.050     0.500

FKSMTX    FK2SMT    FKENDS    FLWRIT    RELBL     EXTNDU    EXTNDL    FKI       FKO
  0.        0.        0.        1.      0.600     0.970     1.000     0.        0.
```

RAE WING PLANFORM

YROOT	XLER	XTER	YTIP	XLET	XTET	XMOM	SREF
0.0	-0.27900	0.84600	2.25000	1.39500	1.77000	0.0	0.0

WING LEADING EDGE

XNLE
2.

N	YLEI(N)	XLEI(N)
1	0.3750	0.0
2	2.2500	1.3950

WING TRAINLING EDGE

XNTE
2.

N	YTEI(N)	XTEI(N)
1	0.3750	1.0000
2	2.2500	1.7700

```
AIRFOIL SECTION INPUT

AIRFOIL SECTION

XNPAN     FNU       FNL       XKSMTH
  2.      76.       76.         0.

N         YP(N)     THETP(N)
1         0.0       0.0
2         1.000000  0.0

X/C AT WHICH UPPER SURFACE ORDINATES ARE INPUT
0.0       0.001000  0.002000  0.003000  0.004000  0.005000  0.006000  0.007000
0.007500  0.008000  0.009000  0.010000  0.012000  0.012500  0.014000  0.016000
0.018000  0.020000  0.025000  0.030000  0.035000  0.040000  0.050000  0.060000
0.070000  0.075000  0.080000  0.090000  0.100000  0.120000  0.140000  0.160000
0.180000  0.200000  0.220000  0.240000  0.260000  0.280000  0.300000  0.320000
0.340000  0.360000  0.380000  0.400000  0.420000  0.440000  0.450000  0.460000
0.480000  0.500000  0.520000  0.540000  0.560000  0.580000  0.600000  0.620000
0.640000  0.660000  0.680000  0.700000  0.720000  0.740000  0.760000  0.780000
0.800000  0.820000  0.840000  0.860000  0.880000  0.900000  0.920000  0.940000
0.960000  0.975000  0.987500  1.000000

X/C AT WHICH LOWER SURFACE ORDINATES ARE INPUT
0.0       0.001000  0.002000  0.003000  0.004000  0.005000  0.006000  0.007000
0.007500  0.008000  0.009000  0.010000  0.012000  0.012500  0.014000  0.016000
0.018000  0.020000  0.025000  0.030000  0.035000  0.040000  0.050000  0.060000
0.070000  0.075000  0.080000  0.090000  0.100000  0.120000  0.140000  0.160000
0.180000  0.200000  0.220000  0.240000  0.260000  0.280000  0.300000  0.320000
0.340000  0.360000  0.380000  0.400000  0.420000  0.440000  0.450000  0.460000
0.480000  0.500000  0.520000  0.540000  0.560000  0.580000  0.600000  0.620000
0.640000  0.660000  0.680000  0.700000  0.720000  0.740000  0.760000  0.780000
0.800000  0.820000  0.840000  0.860000  0.880000  0.900000  0.920000  0.940000
0.960000  0.975000  0.987500  1.000000

Y(N) =0.0          ISAME IS FALSE

THE FOLLOWING ZU/C ARE INPUT
0.0       0.003512  0.004966  0.006078  0.007013  0.007835  0.008576  0.009257
0.009578  0.009888  0.010480  0.011039  0.012074  0.012318  0.013022  0.013901
0.014721  0.015494  0.017257  0.018832  0.020262  0.021577  0.023934  0.026008
0.027863  0.028722  0.029540  0.031067  0.032466  0.034938  0.037046  0.038847
0.040380  0.041674  0.042746  0.043610  0.044271  0.044730  0.044972  0.044960
0.044752  0.044376  0.043855  0.043205  0.042438  0.041565  0.041091  0.040595
0.039539  0.038403  0.037196  0.035924  0.034592  0.033209  0.031779  0.030308
0.028803  0.027267  0.025707  0.024126  0.022531  0.020926  0.019317  0.017707
0.016097  0.014487  0.012878  0.011268  0.009658  0.008049  0.006439  0.004829
0.003219  0.002012  0.001006  0.0

THE FOLLOWING ZL/C ARE INPUT
0.0       -0.003512 -0.004966 -0.006078 -0.007013 -0.007835 -0.008576 -0.009257
-0.009578 -0.009888 -0.010480 -0.011039 -0.012074 -0.012318 -0.013022 -0.013901
-0.014721 -0.015494 -0.017257 -0.018832 -0.020262 -0.021577 -0.023934 -0.026008
-0.027863 -0.028722 -0.029540 -0.031067 -0.032466 -0.034938 -0.037046 -0.038847
-0.040380 -0.041674 -0.042746 -0.043610 -0.044271 -0.044730 -0.044972 -0.044960
-0.044752 -0.044376 -0.043855 -0.043205 -0.042438 -0.041565 -0.041091 -0.040595
-0.039539 -0.038403 -0.037196 -0.035924 -0.034592 -0.033209 -0.031779 -0.030308
-0.028803 -0.027267 -0.025707 -0.024126 -0.022531 -0.020926 -0.019317 -0.017707
-0.016097 -0.014487 -0.012878 -0.011268 -0.009658 -0.008049 -0.006439 -0.004829
-0.003219 -0.002012 -0.001006  0.0

Y(N) =1.000000    ISAME IS TRUE - USE PREVIOUSLY DEFINED AIRFOIL ORDINATES
```

COMPUTATIONAL GRID

N	XI	ETA	ZT	DX	DY	DZ	D2X	D2Y	D2Z
1	-5.35978	0.0	-10.33144	0.0	0.0	0.0	0.0	0.0	0.0
2	-3.77403	0.16667	-7.23611	1.3724	0.1667	2.7320	-0.4268	0.0	-0.7267
3	-2.61504	0.33333	-4.86748	0.9978	0.1667	2.0404	-0.3224	0.0	-0.6565
4	-1.77844	0.50000	-3.15534	0.7140	0.1667	1.4484	-0.2452	0.0	-0.5276
5	-1.18703	0.66667	-1.97077	0.4998	0.1667	0.9899	-0.1831	0.0	-0.3894
6	-0.77874	0.83333	-1.17557	0.3445	0.1667	0.6573	-0.1275	0.0000	-0.2759
7	-0.49796	1.00000	-0.65621	0.2413	0.1667	0.4218	-0.0789	0.0000	-0.1952
8	-0.29610	1.16667	-0.33204	0.1815	0.1667	0.2562	-0.0408	0.0000	-0.1359
9	-0.13501	1.33333	-0.14377	0.1159	0.1667	0.1468	-0.0903	-0.0000	-0.0830
10	-0.06427	1.50000	-0.03848	0.0518	0.1667	0.0911	-0.0379	0.0000	-0.0284
11	-0.03147	1.66667	0.03848	0.0273	0.1667	0.0911	-0.0111	-0.0000	0.0284
12	-0.00977	1.83333	0.14377	0.0206	0.1667	0.1468	-0.0022	0.0000	0.0830
13	0.00977	2.00000	0.33204	0.0199	0.1667	0.2562	0.0007	0.0	0.1359
14	0.02997	2.16667	0.65621	0.0218	0.1667	0.4218	0.0032	-0.0000	0.1952
15	0.05333	2.33333	1.17557	0.0271	0.1708	0.6573	0.0076	0.0083	0.2759
16	0.08425	2.50833	1.97077	0.0380	0.1837	0.9899	0.0141	0.0175	0.3894
17	0.12929	2.70083	3.15534	0.0544	0.2069	1.4484	0.0187	0.0289	0.5276
18	0.19303	2.92220	4.86748	0.0685	0.2435	2.0404	0.0096	0.0443	0.6565
19	0.26633	3.18785	7.23611	0.0716	0.2989	2.7320	-0.0035	0.0664	0.7267
20	0.33615	3.51991	10.33144	0.0684	0.0	0.0	-0.0028	0.0	0.0
21	0.40322	0.0	0.0	0.0674	0.0	0.0	0.0007	0.0	0.0
22	0.47096	0.0	0.0	0.0688	0.0	0.0	0.0022	0.0	0.0
23	0.54085	0.0	0.0	0.0710	0.0	0.0	0.0022	0.0	0.0
24	0.61295	0.0	0.0	0.0727	0.0	0.0	0.0012	0.0	0.0
25	0.68625	0.0	0.0	0.0725	0.0	0.0	-0.0015	0.0	0.0
26	0.75803	0.0	0.0	0.0684	0.0	0.0	-0.0067	0.0	0.0
27	0.82313	0.0	0.0	0.0593	0.0	0.0	-0.0115	0.0	0.0
28	0.87670	0.0	0.0	0.0486	0.0	0.0	-0.0098	0.0	0.0
29	0.92042	0.0	0.0	0.0417	0.0	0.0	-0.0040	0.0	0.0
30	0.96016	0.0	0.0	0.0398	0.0	0.0	0.0001	0.0	0.0
31	1.00000	0.0	0.0	0.0525	0.0	0.0	0.0253	0.0	0.0
32	1.06513	0.0	0.0	0.1163	0.0	0.0	0.1023	0.0	0.0
33	1.23254	0.0	0.0	0.1843	0.0	0.0	0.0337	0.0	0.0
34	1.43368	0.0	0.0	0.2366	0.0	0.0	0.0710	0.0	0.0
35	1.70581	0.0	0.0	0.3311	0.0	0.0	0.1179	0.0	0.0
36	2.09580	0.0	0.0	0.4760	0.0	0.0	0.1720	0.0	0.0
37	2.65773	0.0	0.0	0.6781	0.0	0.0	0.2324	0.0	0.0
38	3.45209	0.0	0.0	0.9477	0.0	0.0	0.3067	0.0	0.0
39	4.55317	0.0	0.0	1.3042	0.0	0.0	0.4063	0.0	0.0
40	6.06056	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

REFERENCE TRAPEZOIDAL WING DESCRIPTION

L.E. SWEEP DX/DY	L.E. SWEEP (DEG.)	T.E. SWEEP DX/DY	T.E. SWEEP (DEG.)	ROOT CHORD	TIP CHORD	WING AREA	ASPECT RATIO	TAPER RATIO	MEAN CHORD	AVERAGE CHORD
0.744	36.668	0.411	22.338	1.125	0.375	1.688	6.000	0.333	0.813	0.750

ACTUAL INPUT WING PLANFORM CHARATERISTICS

K	ETA	Y	XLEW	XTEW	CORDW	JLE(K)	JTE(K)	NX	(X -XLEW)/C	(X -XTEW)/C	XLEWP	XTEWP	K
	NOMINAL WING ROOT												
1	0.0	0.0	-0.2790	0.8460	1.1250	13	31	19	0.0098	1.0000	0.7440	0.4107	1
2	0.0741	0.1667	-0.1550	0.9144	1.0694	13	31	19	0.0098	1.0000	0.7440	0.4107	2
3	0.1481	0.3333	-0.0310	0.9829	1.0139	13	31	19	0.0098	1.0000	0.7440	0.4107	3
4	0.2222	0.5000	0.0930	1.0513	0.9583	13	31	19	0.0098	1.0000	0.7440	0.4107	4
5	0.2963	0.6667	0.2170	1.1196	0.9028	13	31	19	0.0098	1.0000	0.7440	0.4107	5
6	0.3704	0.8333	0.3410	1.1882	0.8472	13	31	19	0.0098	1.0000	0.7440	0.4107	6
7	0.4444	1.0000	0.4650	1.2567	0.7917	13	31	19	0.0098	1.0000	0.7440	0.4107	7
8	0.5185	1.1667	0.5890	1.3251	0.7361	13	31	19	0.0098	1.0000	0.7440	0.4107	8
9	0.5926	1.3333	0.7130	1.3936	0.6806	13	31	19	0.0098	1.0000	0.7440	0.4107	9
10	0.6667	1.5000	0.8370	1.4620	0.6250	13	31	19	0.0098	1.0000	0.7440	0.4107	10
11	0.7407	1.6667	0.9610	1.5304	0.5694	13	31	19	0.0098	1.0000	0.7440	0.4107	11
12	0.8148	1.8333	1.0850	1.5989	0.5139	13	31	19	0.0098	1.0000	0.7440	0.4107	12
13	0.8889	2.0000	1.2090	1.6673	0.4583	13	31	19	0.0098	1.0000	0.7440	0.4107	13
14	0.9630	2.1667	1.3330	1.7358	0.4028	13	31	19	0.0098	1.0000	0.7440	0.4107	14

STRUE = 1.6875
ARTRUE = 6.0000
SEXPOSED= 1.6875
C(MAC) = 0.8132
XLE(MAC)= 0.4170

DETAILS OF XI MAPPING

K	ETA	Y	XI=0.0 XLE	XI=1.0 XTE	XLEP	XTEP	UPSTREAM AND DOWNSTREAM BOUDARIES XUP	XDOWN	XIY(UP)	XIY(DN)	K
	NOMINAL WING ROOT										
1	0.0	0.0	-0.2790	0.8460	0.7440	0.4107	-6.3088	6.5391	-2.2494	1.1344	1
2	0.0741	0.1667	-0.1550	0.9144	0.7440	0.4107	-5.8870	6.3264	-2.3663	1.1933	2
3	0.1481	0.3333	-0.0310	0.9829	0.7440	0.4107	-5.4652	6.1137	-2.4959	1.2587	3
4	0.2222	0.5000	0.0930	1.0513	0.7440	0.4107	-5.0435	5.9010	-2.6406	1.3317	4
5	0.2963	0.6667	0.2170	1.1198	0.7440	0.4107	-4.6217	5.6883	-2.8031	1.4136	5
6	0.3704	0.8333	0.3410	1.1882	0.7440	0.4107	-4.1999	5.4756	-2.9869	1.5063	6
7	0.4444	1.0000	0.4650	1.2567	0.7440	0.4107	-3.7782	5.2629	-3.1965	1.6120	7
8	0.5185	1.1667	0.5890	1.3251	0.7440	0.4107	-3.3564	5.0502	-3.4378	1.7337	8
9	0.5926	1.3333	0.7130	1.3936	0.7440	0.4107	-2.9346	4.8375	-3.7184	1.8752	9
10	0.6667	1.5000	0.8370	1.4620	0.7440	0.4107	-2.5129	4.6248	-4.0490	2.0419	10
11	0.7407	1.6667	0.9610	1.5304	0.7440	0.4107	-2.0911	4.4122	-4.4440	2.2411	11
12	0.8148	1.8333	1.0850	1.5989	0.7440	0.4107	-1.6693	4.1995	-4.9244	2.4834	12
13	0.8889	2.0000	1.2090	1.6673	0.7440	0.4107	-1.2476	3.9868	-5.5213	2.7844	13
14	0.9630	2.1667	1.3330	1.7358	0.7440	0.4107	-0.8258	3.7741	-6.2828	3.1685	14
	NOMINAL WING TIP										
15	1.0370	2.3333	1.4565	1.8047	0.7317	0.4230	-0.4101	3.5671	-6.8511	3.2703	15
16	1.1148	2.5063	1.5823	1.8810	0.7057	0.4489	-0.0191	3.3930	-6.9687	2.8468	16
17	1.2004	2.7008	1.7154	1.9702	0.6772	0.4775	0.3495	3.2598	-6.8588	2.0932	17
18	1.2988	2.9222	1.8616	2.0795	0.6444	0.5103	0.6939	3.1821	-6.2582	0.7742	18
19	1.4168	3.1879	2.0276	2.2203	0.6051	0.5496	0.9948	3.1954	-4.6825	-1.3960	19
20	1.5644	3.5199	2.2219	2.4094	0.5773	0.5773	1.2170	3.3563	-3.0791	-3.0791	20

WING SURFACE GEOMETRY

K= 1 Y= 0.0 ETA = 0.0 CHORD = 1.1250 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550594	-0.550576	28.83691	-28.83612
2	0.029974	0.018824	-0.018824	0.299506	-0.299503	16.67328	-16.67310
3	0.053328	0.024652	-0.024652	0.211343	-0.211344	11.93345	-11.93351
4	0.084254	0.030206	-0.030206	0.153643	-0.153643	8.73482	-8.73480
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04385
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60159	-3.60157
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42143
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75042	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08807	2.08807
10	0.470956	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03456
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73577
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51109
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876696	0.009924	-0.009924	-0.080481	0.080481	-4.60132	4.60132
17	0.920421	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960164	0.003206	-0.003206	-0.080478	0.080478	-4.60114	4.60114
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 2 Y= 0.1667 ETA = 0.0741 CHORD = 1.0694 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550594	-0.550577	28.83693	-28.83615
2	0.029974	0.018824	-0.018824	0.299507	-0.299503	16.67329	-16.67311
3	0.053328	0.024652	-0.024652	0.211343	-0.211344	11.93346	-11.93351
4	0.084254	0.030206	-0.030206	0.153644	-0.153643	8.73482	-8.73481
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04385
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60159	-3.60157
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75043	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08807	2.08807
10	0.470956	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03457
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73576
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51110
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876696	0.009924	-0.009924	-0.080481	0.080481	-4.60133	4.60133
17	0.920422	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960164	0.003206	-0.003206	-0.080478	0.080478	-4.60115	4.60115
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K= 3 Y= 0.3333 ETA = 0.1481 CHORD = 1.0139 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550594	-0.550577	28.83691	-28.83617
2	0.029974	0.018824	-0.018824	0.299506	-0.299503	16.67329	-16.67311
3	0.053327	0.024652	-0.024652	0.211343	-0.211344	11.93345	-11.93351
4	0.084254	0.030206	-0.030206	0.153644	-0.153643	8.73482	-8.73480
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04386
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60159	-3.60158
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75043	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08806	2.08807
10	0.470956	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03457

11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73576
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51110
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876696	0.009924	-0.009924	-0.080481	0.080481	-4.60133	4.60133
17	0.920421	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960164	0.003206	-0.003206	-0.080478	0.080478	-4.60114	4.60114
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 4 Y= 0.5000 ETA = 0.2222 CHORD = 0.9583 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550595	-0.550578	28.83696	-28.83621
2	0.029974	0.018824	-0.018824	0.299507	-0.299504	16.67331	-16.67314
3	0.053327	0.024652	-0.024652	0.211343	-0.211344	11.93346	-11.93353
4	0.084254	0.030206	-0.030206	0.153645	-0.153643	8.73489	-8.73481
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04385
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60159	-3.60158
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75043	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08807	2.08807
10	0.470956	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03457
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73576
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51110
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876696	0.009924	-0.009924	-0.080481	0.080481	-4.60132	4.60132
17	0.920422	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960164	0.003206	-0.003206	-0.080478	0.080478	-4.60115	4.60115
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K= 5 Y= 0.6667 ETA = 0.2963 CHORD = 0.9028 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550594	-0.550578	28.83691	-28.83620
2	0.029974	0.018824	-0.018824	0.299507	-0.299503	16.67329	-16.67311
3	0.053327	0.024652	-0.024652	0.211343	-0.211344	11.93345	-11.93352
4	0.084254	0.030206	-0.030206	0.153643	-0.153643	8.73481	-8.73480
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04385
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60159	-3.60157
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75042	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08807	2.08807
10	0.470956	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03456
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73576
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51109
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59979	4.59979
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60132	4.60132
17	0.920421	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960164	0.003206	-0.003206	-0.080478	0.080478	-4.60114	4.60114
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 6 Y= 0.8333 ETA = 0.3704 CHORD = 0.8472 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550594	-0.550578	28.83691	-28.83621
2	0.029974	0.018824	-0.018824	0.299506	-0.299503	16.67328	-16.67310
3	0.053327	0.024652	-0.024652	0.211343	-0.211344	11.93345	-11.93352
4	0.084254	0.030206	-0.030206	0.153643	-0.153643	8.73482	-8.73480

5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04385
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60159	-3.60157
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75042	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08807	2.08807
10	0.470956	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03456
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73576
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51110
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823129	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60132	4.60132
17	0.920421	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960163	0.003206	-0.003206	-0.080478	0.080478	-4.60114	4.60114
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

KSWICH= 0

K= 7 Y= 1.0000 ETA = 0.4444 CHORD = 0.7917 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550594	-0.550578	28.83693	-28.83621
2	0.029974	0.018824	-0.018824	0.299507	-0.299503	16.67329	-16.67311
3	0.053327	0.024652	-0.024652	0.211343	-0.211344	11.93346	-11.93353
4	0.084254	0.030206	-0.030206	0.153645	-0.153643	8.73469	-8.73481
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04385
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60159	-3.60158
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75043	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08807	2.08807
10	0.470956	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03457
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73577	3.73577
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51109
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60132	4.60132
17	0.920421	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960164	0.003206	-0.003206	-0.080478	0.080478	-4.60115	4.60115
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K= 8 Y= 1.1667 ETA = 0.5185 CHORD = 0.7361 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550595	-0.550578	28.83694	-28.83621
2	0.029974	0.018824	-0.018824	0.299507	-0.299503	16.67329	-16.67311
3	0.053327	0.024652	-0.024652	0.211343	-0.211344	11.93346	-11.93353
4	0.084254	0.030206	-0.030206	0.153644	-0.153643	8.73482	-8.73481
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04385
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60159	-3.60158
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75043	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08807	2.08807
10	0.470956	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03457
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73577	3.73577
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686249	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51109
14	0.758031	0.019476	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823129	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60133	4.60133
17	0.920420	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960163	0.003206	-0.003206	-0.080478	0.080478	-4.60115	4.60115
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K= 9   Y=   1.3333   ETA = 0.5926   CHORD =   0.6806   TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550595	-0.550579	28.83696	-28.83623
2	0.029974	0.018824	-0.018824	0.299507	-0.299503	16.67331	-16.67311
3	0.053327	0.024652	-0.024652	0.211343	-0.211345	11.93347	-11.93354
4	0.084254	0.030207	-0.030207	0.153644	-0.153643	8.73483	-8.73482
5	0.129269	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04386
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60160	-3.60158
7	0.266327	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75043	0.75044
9	0.403216	0.043089	-0.043089	-0.036460	0.036460	-2.08808	2.08807
10	0.470954	0.040027	-0.040027	-0.053012	0.053013	-3.03455	3.03455
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73577	3.73577
12	0.612954	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686249	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51110
14	0.758031	0.019475	-0.019475	-0.080484	0.080484	-4.60149	4.60149
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60133	4.60133
17	0.920420	0.006405	-0.006405	-0.080506	0.080506	-4.60272	4.60272
18	0.960163	0.003206	-0.003206	-0.080478	0.080478	-4.60115	4.60115
19	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60124	4.60124

K=10   Y=   1.5000   ETA = 0.6667   CHORD =   0.6250   TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550595	-0.550580	28.83698	-28.83630
2	0.029974	0.018824	-0.018824	0.299507	-0.299504	16.67331	-16.67316
3	0.053327	0.024652	-0.024652	0.211343	-0.211345	11.93347	-11.93355
4	0.084254	0.030206	-0.030207	0.153645	-0.153644	8.73490	-8.73482
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04386
6	0.193029	0.041249	-0.041249	0.062943	-0.062942	3.60160	-3.60158
7	0.266326	0.044438	-0.044438	0.024815	-0.024814	1.42148	-1.42145
8	0.336151	0.044806	-0.044806	-0.013098	0.013098	-0.75043	0.75044
9	0.403215	0.043089	-0.043089	-0.036459	0.036459	-2.08804	2.08805
10	0.470954	0.040027	-0.040027	-0.053012	0.053013	-3.03455	3.03455
11	0.540847	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73576
12	0.612954	0.030830	-0.030830	-0.073836	0.073837	-4.22285	4.22286
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51110	4.51110
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60149	4.60149
15	0.823129	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60133	4.60133
17	0.920421	0.006405	-0.006405	-0.080506	0.080506	-4.60272	4.60272
18	0.960164	0.003206	-0.003206	-0.080478	0.080478	-4.60115	4.60115
19	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60124	4.60124

K=11   Y=   1.6667   ETA = 0.7407   CHORD =   0.5694   TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550595	-0.550580	28.83694	-28.83629
2	0.029974	0.018824	-0.018824	0.299507	-0.299504	16.67331	-16.67314
3	0.053327	0.024652	-0.024652	0.211343	-0.211344	11.93346	-11.93353
4	0.084253	0.030206	-0.030206	0.153646	-0.153646	8.73497	-8.73493
5	0.129288	0.035958	-0.035958	0.105879	-0.105879	6.04393	-6.04389
6	0.193029	0.041249	-0.041249	0.062943	-0.062943	3.60159	-3.60159
7	0.266326	0.044438	-0.044438	0.024815	-0.024814	1.42148	-1.42146
8	0.336149	0.044806	-0.044806	-0.013098	0.013098	-0.75040	0.75041
9	0.403215	0.043089	-0.043089	-0.036459	0.036459	-2.08804	2.08805
10	0.470955	0.040027	-0.040027	-0.053012	0.053013	-3.03455	3.03455
11	0.540847	0.035869	-0.035869	-0.065294	0.065294	-3.73575	3.73576
12	0.612955	0.030830	-0.030830	-0.073836	0.073836	-4.22285	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51109

14	0.758031	0.019476	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823128	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60133	4.60133
17	0.920421	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960163	0.003206	-0.003206	-0.080476	0.080478	-4.60115	4.60115
19	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K=12   Y= 1.8333   ETA = 0.8148   CHORD = 0.5139   TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009773	0.010914	-0.010915	0.550595	-0.550581	28.83696	-28.83635
2	0.029973	0.018824	-0.018824	0.299512	-0.299507	16.67357	-16.67334
3	0.053326	0.024651	-0.024652	0.211347	-0.211347	11.93370	-11.93369
4	0.084253	0.030206	-0.030206	0.153645	-0.153645	8.73490	-8.73490
5	0.129288	0.035958	-0.035958	0.105879	-0.105879	6.04393	-6.04391
6	0.193029	0.041249	-0.041249	0.062943	-0.062943	3.60162	-3.60159
7	0.266325	0.044438	-0.044438	0.024815	-0.024815	1.42151	-1.42148
8	0.336150	0.044806	-0.044806	-0.013098	0.013098	-0.75040	0.75042
9	0.403215	0.043089	-0.043089	-0.036459	0.036459	-2.08804	2.08805
10	0.470955	0.040027	-0.040027	-0.053013	0.053013	-3.03456	3.03456
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73576
12	0.612953	0.030831	-0.030830	-0.073836	0.073836	-4.22284	4.22285
13	0.686250	0.025215	-0.025215	-0.078897	0.078897	-4.51109	4.51109
14	0.758032	0.019475	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60132	4.60132
17	0.920422	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960163	0.003206	-0.003206	-0.080478	0.080478	-4.60115	4.60115
19	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=13   Y= 2.0000   ETA = 0.8889   CHORD = 0.4563   TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009771	0.010914	-0.010914	0.550643	-0.550624	28.83907	-28.83824
2	0.029973	0.018824	-0.018824	0.299512	-0.299507	16.67355	-16.67329
3	0.053327	0.024652	-0.024652	0.211345	-0.211345	11.93357	-11.93354
4	0.084253	0.030206	-0.030206	0.153645	-0.153644	8.73489	-8.73487
5	0.129289	0.035958	-0.035958	0.105879	-0.105878	6.04388	-6.04385
6	0.193028	0.041249	-0.041249	0.062943	-0.062943	3.60162	-3.60161
7	0.266326	0.044438	-0.044438	0.024814	-0.024814	1.42145	-1.42144
8	0.336150	0.044806	-0.044806	-0.013098	0.013098	-0.75040	0.75042
9	0.403214	0.043089	-0.043089	-0.036459	0.036459	-2.08804	2.08804
10	0.470955	0.040027	-0.040027	-0.053013	0.053013	-3.03455	3.03455
11	0.540847	0.035869	-0.035869	-0.065294	0.065294	-3.73575	3.73575
12	0.612953	0.030830	-0.030830	-0.073836	0.073836	-4.22284	4.22284
13	0.686249	0.025215	-0.025215	-0.078896	0.078897	-4.51109	4.51109
14	0.758031	0.019476	-0.019475	-0.080484	0.080484	-4.60148	4.60148
15	0.823129	0.014235	-0.014235	-0.080455	0.080455	-4.59980	4.59980
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60132	4.60132
17	0.920420	0.006405	-0.006405	-0.080506	0.080506	-4.60271	4.60271
18	0.960162	0.003206	-0.003206	-0.080478	0.080478	-4.60114	4.60114
19	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=14   Y= 2.1667   ETA = 0.9630   CHORD = 0.4028   TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.009772	0.010914	-0.010914	0.550620	-0.550609	28.83804	-28.83759
2	0.029973	0.018824	-0.018824	0.299511	-0.299505	16.67354	-16.67323
3	0.053326	0.024651	-0.024651	0.211347	-0.211347	11.93368	-11.93368
4	0.084254	0.030206	-0.030206	0.153645	-0.153644	8.73489	-8.73484
5	0.129288	0.035958	-0.035958	0.105879	-0.105879	6.04392	-6.04389
6	0.193027	0.041249	-0.041249	0.062944	-0.062943	3.60165	-3.60163
7	0.266326	0.044438	-0.044438	0.024815	-0.024814	1.42148	-1.42147

8	0.336150	0.044806	-0.044806	-0.013098	0.013098	-0.75040	0.75042
9	0.403214	0.043089	-0.043089	-0.036459	0.036459	-2.08804	2.08803
10	0.470955	0.040027	-0.040027	-0.053013	0.053012	-3.03455	3.03455
11	0.540848	0.035869	-0.035869	-0.065294	0.065294	-3.73576	3.73576
12	0.612953	0.030830	-0.030830	-0.073836	0.073836	-4.22283	4.22284
13	0.686249	0.025215	-0.025215	-0.078896	0.078896	-4.51108	4.51108
14	0.758031	0.019475	-0.019475	-0.080484	0.080484	-4.60147	4.60147
15	0.823130	0.014235	-0.014235	-0.080455	0.080455	-4.59979	4.59979
16	0.876695	0.009924	-0.009924	-0.080481	0.080481	-4.60132	4.60132
17	0.920420	0.006405	-0.006405	-0.080506	0.080506	-4.60270	4.60270
18	0.960163	0.003206	-0.003206	-0.080478	0.080478	-4.60114	4.60114
19	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

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         RESIDUAL PARAMETERS
  MESH   ITER     ERROR      ERRAV      JE   KE   LE     BIGRL       RSDAV     JRD  KRD  LRD     NSUP      LIFT           PJRSD      KPJ

  FINE      1  0.1174E-01  0.2125E-03   31    2   11  0.7929E+01  0.1021E+00   14   14   10        0  0.0            0.6658E-02    2

IHO208I IBCOM - PROGRAM INTERRUPT (P) -  UNDERFLOW   OLD PSW IS  071D000D626EAEC2 . REGISTER CONTAINED    FDBFEEB1

TRACEBACK  ROUTINE   CALLED FROM ISN    REG. 14    REG. 15    REG.  0    REG.  1

           SOLVE               0047     526C71B8   006E7CA8   00000000   006C6F10

           MAIN                         00019412   016C6D38   00CFDA58   0083EFC8

ENTRY POINT=  016C6D38

STANDARD FIXUP TAKEN . EXECUTION CONTINUING

IHO208I IBCOM - PROGRAM INTERRUPT (P) -  UNDERFLOW   OLD PSW IS  071D000D626EAEC2 . REGISTER CONTAINED    FDA91BBE

TRACEBACK  ROUTINE   CALLED FROM ISN    REG. 14    REG. 15    REG.  0    REG.  1

           SOLVE               0047     526C71B8   006E7CA8   00000000   006C6F10

           MAIN                         00019412   016C6D38   00CFDA58   0083EFC8

ENTRY POINT=  016C6D38

STANDARD FIXUP TAKEN . EXECUTION CONTINUING

IHO208I IBCOM - PROGRAM INTERRUPT (P) -  UNDERFLOW   OLD PSW IS  071D000D526EAF56 . REGISTER CONTAINED    FD1790D7

TRACEBACK  ROUTINE   CALLED FROM ISN    REG. 14    REG. 15    REG.  0    REG.  1

           SOLVE               0047     526C71B8   006E7CA8   00000000   006C6F10

           MAIN                         00019412   016C6D38   00CFDA58   0083EFC8

ENTRY POINT=  016C6D38

STANDARD FIXUP TAKEN . EXECUTION CONTINUING

IHO208I IBCOM - PROGRAM INTERRUPT (P) -  UNDERFLOW   OLD PSW IS  071D000D526EAF56 . REGISTER CONTAINED    FD14CEFC

TRACEBACK  ROUTINE   CALLED FROM ISN    REG. 14    REG. 15    REG.  0    REG.  1

           SOLVE               0047     526C71B8   006E7CA8   00000000   006C6F10

           MAIN                         00019412   016C6D38   00CFDA58   0083EFC8

ENTRY POINT=  016C6D38

STANDARD FIXUP TAKEN . EXECUTION CONTINUING

IHO208I IBCOM - PROGRAM INTERRUPT (P) -  UNDERFLOW   OLD PSW IS  071D000D526EAF56 . REGISTER CONTAINED    F764333B

TRACEBACK  ROUTINE   CALLED FROM ISN    REG. 14    REG. 15    REG.  0    REG.  1

           SOLVE               0047     526C71B8   006E7CA8   00000000   006C6F10

           MAIN                         00019412   016C6D38   00CFDA58   0083EFC8

ENTRY POINT=  016C6D38

STANDARD FIXUP TAKEN . EXECUTION CONTINUING
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FINE	2	0.7438E-02	0.2664E-03	30	3	11	0.9896E+01	0.1800E+00	14	14	10	0	0.1330E-01	0.3556E-02	1
FINE	3	0.5636E-02	0.2320E-03	30	4	11	0.1355E+02	0.1427E+00	13	14	10	0	0.1902E-01	0.2375E-02	1
FINE	4	0.4568E-02	0.2199E-03	29	5	11	0.2023E+02	0.1585E+00	13	14	10	0	0.2327E-01	0.1815E-02	1
FINE	5	0.3740E-02	0.2144E-03	29	6	11	0.2690E+02	0.1836E+00	13	14	10	26	0.2702E-01	0.1562E-02	1
FINE	6	0.3098E-02	0.2088E-03	14	3	10	0.2710E+02	0.1997E+00	13	14	10	55	0.3032E-01	0.1390E-02	1
FINE	7	0.2912E-02	0.2030E-03	13	4	10	0.2492E+02	0.2088E+00	13	14	10	82	0.3324E-01	0.1267E-02	2
FINE	8	0.2694E-02	0.1975E-03	13	4	10	0.2233E+02	0.2146E+00	13	14	10	121	0.3596E-01	0.1162E-02	2
FINE	9	0.2445E-02	0.1914E-03	12	4	10	0.1944E+02	0.2146E+00	12	14	10	155	0.3853E-01	0.1070E-02	2
FINE	10	0.2351E-02	0.1846E-03	14	4	9	0.1653E+02	0.2088E+00	13	13	10	180	0.4093E-01	0.9911E-03	2
FINE	11	0.2223E-02	0.1776E-03	13	4	9	0.1425E+02	0.1995E+00	13	13	10	202	0.4318E-01	0.9188E-03	2
FINE	12	0.2090E-02	0.1704E-03	13	4	9	0.1220E+02	0.1876E+00	13	13	10	222	0.4531E-01	0.8563E-03	2
FINE	13	0.1950E-02	0.1633E-03	12	5	9	0.1053E+02	0.1765E+00	13	13	10	251	0.4733E-01	0.8091E-03	3
FINE	14	0.1785E-02	0.1566E-03	11	5	9	0.9168E+01	0.1644E+00	13	13	10	269	0.4926E-01	0.7709E-03	4
FINE	15	0.1623E-02	0.1502E-03	11	5	9	0.8004E+01	0.1533E+00	13	12	10	294	0.5111E-01	0.7472E-03	6
FINE	16	0.1460E-02	0.1443E-03	13	5	8	0.7035E+01	0.1440E+00	13	12	10	306	0.5289E-01	0.7260E-03	7
FINE	17	0.1414E-02	0.1388E-03	13	5	8	0.6084E+01	0.1361E+00	13	10	10	319	0.5462E-01	0.7068E-03	7
FINE	18	0.1341E-02	0.1337E-03	12	5	8	0.5308E+01	0.1291E+00	12	9	10	334	0.5630E-01	0.6881E-03	7
FINE	19	0.1254E-02	0.1288E-03	12	5	8	0.5171E+01	0.1232E+00	13	15	12	356	0.5793E-01	0.6675E-03	7
FINE	20	0.1158E-02	0.1244E-03	11	5	8	0.5435E+01	0.1185E+00	13	15	12	367	0.5950E-01	0.6490E-03	8
FINE	21	0.1066E-02	0.1201E-03	11	5	8	0.5497E+01	0.1149E+00	13	16	12	383	0.6103E-01	0.6299E-03	8
FINE	22	0.9893E-03	0.1163E-03	11	4	8	0.5583E+01	0.1119E+00	13	16	12	394	0.6251E-01	0.6107E-03	8
FINE	23	0.9381E-03	0.1128E-03	12	3	8	0.5571E+01	0.1096E+00	13	15	13	410	0.6395E-01	0.5926E-03	7
FINE	24	0.8973E-03	0.1097E-03	14	2	8	0.5632E+01	0.1080E+00	13	15	13	416	0.6534E-01	0.5763E-03	7
FINE	25	0.8633E-03	0.1069E-03	14	2	8	0.5945E+01	0.1071E+00	13	15	13	423	0.6670E-01	0.5606E-03	8
FINE	26	0.8283E-03	0.1045E-03	13	2	8	0.5956E+01	0.1069E+00	13	15	13	426	0.6802E-01	0.5473E-03	8
FINE	27	0.7928E-03	0.1024E-03	16	1	8	0.5902E+01	0.1071E+00	13	15	13	429	0.6930E-01	0.5351E-03	8
FINE	28	0.7602E-03	0.1005E-03	15	1	8	0.5958E+01	0.1077E+00	13	16	13	431	0.7055E-01	0.5231E-03	8
FINE	29	0.7292E-03	0.9867E-04	15	1	8	0.6017E+01	0.1081E+00	13	16	13	434	0.7177E-01	0.5110E-03	8
FINE	30	0.6957E-03	0.9696E-04	15	1	8	0.5945E+01	0.1084E+00	13	16	13	440	0.7295E-01	0.4990E-03	8
FINE	31	0.6627E-03	0.9527E-04	13	2	9	0.5731E+01	0.1083E+00	13	16	13	440	0.7411E-01	0.4872E-03	8
FINE	32	0.6362E-03	0.9360E-04	13	2	9	0.5396E+01	0.1077E+00	13	16	13	444	0.7523E-01	0.4750E-03	8
FINE	33	0.6107E-03	0.9190E-04	14	2	10	0.5219E+01	0.1069E+00	13	15	14	443	0.7633E-01	0.4623E-03	8
FINE	34	0.5854E-03	0.9015E-04	13	2	10	0.5355E+01	0.1057E+00	13	15	14	449	0.7740E-01	0.4509E-03	7
FINE	35	0.5605E-03	0.8832E-04	13	2	10	0.5384E+01	0.1041E+00	13	15	14	449	0.7843E-01	0.4397E-03	7
FINE	36	0.5449E-03	0.8644E-04	23	9	11	0.5297E+01	0.1023E+00	13	15	14	451	0.7944E-01	0.4284E-03	7
FINE	37	0.5296E-03	0.8450E-04	23	9	11	0.5102E+01	0.1003E+00	13	15	14	450	0.8043E-01	0.4190E-03	6
FINE	38	0.5169E-03	0.8253E-04	24	7	11	0.4816E+01	0.9796E-01	13	15	14	450	0.8139E-01	0.4101E-03	6
FINE	39	0.5096E-03	0.8053E-04	24	7	11	0.4464E+01	0.9543E-01	13	15	14	453	0.8233E-01	0.4012E-03	6
FINE	40	0.5022E-03	0.7852E-04	24	7	11	0.4078E+01	0.9278E-01	13	15	14	455	0.8325E-01	0.3935E-03	5
FINE	41	0.4949E-03	0.7653E-04	24	7	11	0.3731E+01	0.9011E-01	13	16	14	456	0.8414E-01	0.3863E-03	5
FINE	42	0.4880E-03	0.7456E-04	24	7	11	0.3456E+01	0.8748E-01	13	16	14	460	0.8502E-01	0.3793E-03	5
FINE	43	0.4813E-03	0.7262E-04	24	7	11	0.3208E+01	0.8490E-01	13	16	14	462	0.8588E-01	0.3731E-03	4
FINE	44	0.4761E-03	0.7073E-04	25	5	11	0.3093E+01	0.8239E-01	13	15	15	458	0.8672E-01	0.3675E-03	4
FINE	45	0.4709E-03	0.6888E-04	25	5	11	0.3042E+01	0.7995E-01	13	15	15	456	0.8755E-01	0.3623E-03	4
FINE	46	0.4656E-03	0.6706E-04	25	5	11	0.2968E+01	0.7760E-01	13	15	15	456	0.8836E-01	0.3571E-03	4
FINE	47	0.4609E-03	0.6530E-04	28	1	11	0.2876E+01	0.7534E-01	13	15	15	461	0.8915E-01	0.3524E-03	3
FINE	48	0.4581E-03	0.6358E-04	28	1	11	0.2774E+01	0.7318E-01	13	15	15	465	0.8993E-01	0.3479E-03	3
FINE	49	0.4550E-03	0.6192E-04	28	1	11	0.2686E+01	0.7112E-01	13	16	15	466	0.9070E-01	0.3436E-03	3
FINE	50	0.4518E-03	0.6030E-04	28	1	11	0.2615E+01	0.6917E-01	13	16	15	469	0.9145E-01	0.3392E-03	3
FINE	51	0.4485E-03	0.5875E-04	28	1	11	0.2544E+01	0.6731E-01	13	16	15	471	0.9219E-01	0.3351E-03	3
FINE	52	0.4451E-03	0.5726E-04	28	1	11	0.2491E+01	0.6555E-01	13	17	14	471	0.9291E-01	0.3310E-03	3
FINE	53	0.4417E-03	0.5583E-04	28	1	11	0.2446E+01	0.6388E-01	13	17	14	476	0.9362E-01	0.3273E-03	3
FINE	54	0.4380E-03	0.5446E-04	28	1	11	0.2405E+01	0.6230E-01	13	17	14	478	0.9432E-01	0.3237E-03	2
FINE	55	0.4342E-03	0.5316E-04	28	1	11	0.2367E+01	0.6082E-01	13	17	14	479	0.9501E-01	0.3203E-03	2
FINE	56	0.4300E-03	0.5192E-04	28	1	11	0.2333E+01	0.5944E-01	13	17	15	482	0.9568E-01	0.3170E-03	2
FINE	57	0.4250E-03	0.5074E-04	28	1	11	0.2305E+01	0.5815E-01	13	17	15	481	0.9635E-01	0.3134E-03	2
FINE	58	0.4195E-03	0.4962E-04	28	1	11	0.2277E+01	0.5696E-01	13	17	15	482	0.9700E-01	0.3098E-03	2
FINE	59	0.4103E-03	0.4857E-04	28	1	11	0.2250E+01	0.5587E-01	13	17	15	481	0.9764E-01	0.3061E-03	2

RESIDUAL PARAMETERS

MESH	ITER	ERROR	ERRAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJRSD	KPJ
FINE	60	0.4023E-03	0.4757E-04	28	1	11	0.2224E+01	0.5486E-01	13	17	15	481	0.9827E-01	0.3028E-03	3

RESIDUAL PARAMETERS

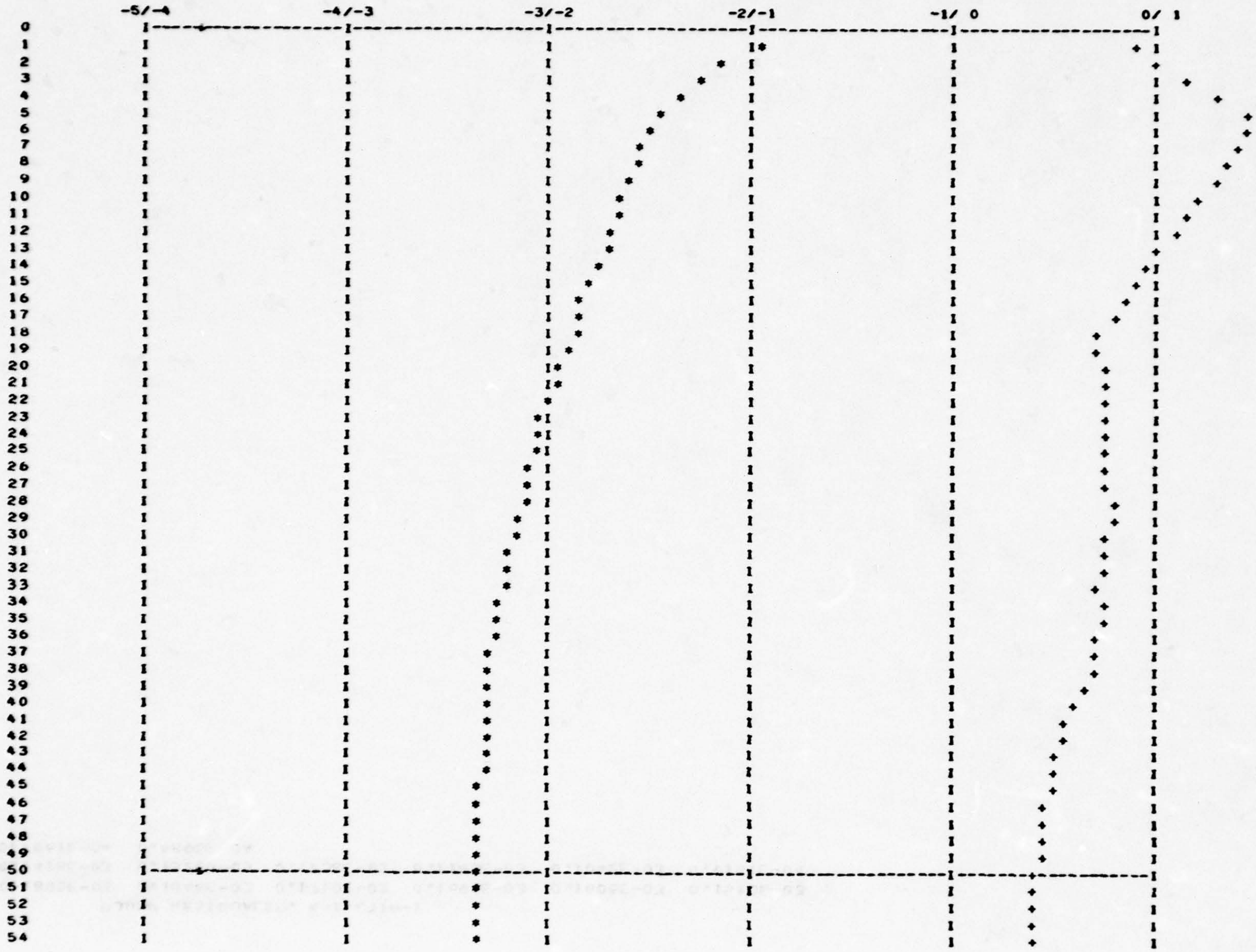
MESH	ITER	ERROR	ERRAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJKSD	KPJ
FINE	61	0.3949E-03	0.4663E-04	28	1	11	0.2198E+01	0.5393E-01	13	17	15	480	0.9889E-01	0.2995E-03	2
FINE	62	0.3879E-03	0.4574E-04	28	1	11	0.2174E+01	0.5306E-01	13	17	15	482	0.9951E-01	0.2963E-03	2
FINE	63	0.3811E-03	0.4490E-04	28	1	11	0.2149E+01	0.5226E-01	13	17	15	481	0.1001E+00	0.2935E-03	2
FINE	64	0.3745E-03	0.4410E-04	28	1	11	0.2125E+01	0.5151E-01	13	17	15	482	0.1007E+00	0.2905E-03	2
FINE	65	0.3681E-03	0.4334E-04	28	1	11	0.2101E+01	0.5081E-01	13	17	15	483	0.1013E+00	0.2874E-03	2
FINE	66	0.3619E-03	0.4261E-04	28	1	11	0.2077E+01	0.5015E-01	13	17	15	484	0.1019E+00	0.2844E-03	2
FINE	67	0.3557E-03	0.4192E-04	28	1	11	0.2052E+01	0.4953E-01	13	17	15	481	0.1024E+00	0.2814E-03	2
FINE	68	0.3512E-03	0.4125E-04	29	1	11	0.2028E+01	0.4894E-01	13	17	15	484	0.1030E+00	0.2790E-03	2
FINE	69	0.3469E-03	0.4061E-04	29	1	11	0.2007E+01	0.4837E-01	13	18	15	485	0.1035E+00	0.2771E-03	2
FINE	70	0.3427E-03	0.4000E-04	29	1	11	0.1989E+01	0.4781E-01	13	18	15	486	0.1041E+00	0.2752E-03	2
FINE	71	0.3387E-03	0.3940E-04	29	1	11	0.1971E+01	0.4726E-01	13	18	15	486	0.1046E+00	0.2726E-03	2
FINE	72	0.3349E-03	0.3883E-04	29	1	11	0.1952E+01	0.4673E-01	13	18	15	487	0.1052E+00	0.2701E-03	2
FINE	73	0.3312E-03	0.3827E-04	29	1	11	0.1933E+01	0.4622E-01	13	18	15	487	0.1057E+00	0.2676E-03	2
FINE	74	0.3272E-03	0.3773E-04	29	1	11	0.1913E+01	0.4571E-01	13	18	15	488	0.1062E+00	0.2660E-03	1
FINE	75	0.3232E-03	0.3721E-04	29	1	11	0.1894E+01	0.4522E-01	13	18	15	487	0.1067E+00	0.2641E-03	1
FINE	76	0.3188E-03	0.3671E-04	29	1	11	0.1874E+01	0.4473E-01	13	18	15	487	0.1072E+00	0.2621E-03	1
FINE	77	0.3142E-03	0.3622E-04	29	1	11	0.1854E+01	0.4425E-01	13	18	15	488	0.1077E+00	0.2603E-03	1
FINE	78	0.3093E-03	0.3575E-04	29	1	11	0.1834E+01	0.4378E-01	13	18	15	488	0.1082E+00	0.2582E-03	1
FINE	79	0.3042E-03	0.3529E-04	29	1	11	0.1815E+01	0.4331E-01	13	18	15	488	0.1087E+00	0.2561E-03	1
FINE	80	0.2987E-03	0.3485E-04	29	1	11	0.1795E+01	0.4286E-01	13	18	15	489	0.1091E+00	0.2538E-03	1
FINE	81	0.2930E-03	0.3443E-04	29	1	11	0.1776E+01	0.4241E-01	13	18	15	489	0.1096E+00	0.2513E-03	1
FINE	82	0.2869E-03	0.3402E-04	29	1	11	0.1756E+01	0.4198E-01	13	18	15	489	0.1101E+00	0.2487E-03	1
FINE	83	0.2806E-03	0.3363E-04	29	1	11	0.1737E+01	0.4154E-01	13	18	15	490	0.1105E+00	0.2462E-03	1
FINE	84	0.2740E-03	0.3325E-04	29	1	11	0.1718E+01	0.4112E-01	13	18	15	489	0.1110E+00	0.2434E-03	1
FINE	85	0.2673E-03	0.3288E-04	29	1	11	0.1699E+01	0.4071E-01	13	18	15	487	0.1114E+00	0.2405E-03	1
FINE	86	0.2602E-03	0.3253E-04	29	1	11	0.1680E+01	0.4030E-01	13	18	15	487	0.1118E+00	0.2376E-03	1
FINE	87	0.2530E-03	0.3219E-04	29	1	11	0.1662E+01	0.3990E-01	13	18	15	486	0.1123E+00	0.2343E-03	1
FINE	88	0.2458E-03	0.3186E-04	29	1	11	0.1643E+01	0.3950E-01	13	18	15	487	0.1127E+00	0.2312E-03	1
FINE	89	0.2385E-03	0.3153E-04	29	1	11	0.1625E+01	0.3910E-01	13	18	15	487	0.1131E+00	0.2279E-03	1
FINE	90	0.2311E-03	0.3121E-04	29	1	11	0.1607E+01	0.3870E-01	13	18	15	487	0.1135E+00	0.2245E-03	1
FINE	91	0.2250E-03	0.3088E-04	28	1	11	0.1589E+01	0.3831E-01	13	18	15	487	0.1139E+00	0.2211E-03	1
FINE	92	0.2195E-03	0.3057E-04	28	1	11	0.1571E+01	0.3791E-01	13	18	15	487	0.1143E+00	0.2175E-03	1
FINE	93	0.2141E-03	0.3025E-04	28	1	11	0.1553E+01	0.3752E-01	13	18	15	486	0.1147E+00	0.2140E-03	1
FINE	94	0.2086E-03	0.2993E-04	28	1	11	0.1536E+01	0.3712E-01	13	18	15	486	0.1151E+00	0.2105E-03	1
FINE	95	0.2032E-03	0.2961E-04	28	1	11	0.1519E+01	0.3673E-01	13	18	15	486	0.1155E+00	0.2070E-03	1
FINE	96	0.1979E-03	0.2930E-04	28	1	11	0.1501E+01	0.3634E-01	13	18	15	486	0.1159E+00	0.2033E-03	1
FINE	97	0.1926E-03	0.2898E-04	28	1	11	0.1484E+01	0.3595E-01	13	18	15	485	0.1162E+00	0.1998E-03	1
FINE	98	0.1873E-03	0.2866E-04	28	1	11	0.1467E+01	0.3556E-01	13	18	15	484	0.1166E+00	0.1962E-03	1
FINE	99	0.1822E-03	0.2834E-04	28	1	11	0.1450E+01	0.3517E-01	13	18	15	484	0.1170E+00	0.1929E-03	1
FINE	100	0.1771E-03	0.2802E-04	28	1	11	0.1434E+01	0.3478E-01	13	18	15	484	0.1173E+00	0.1890E-03	1

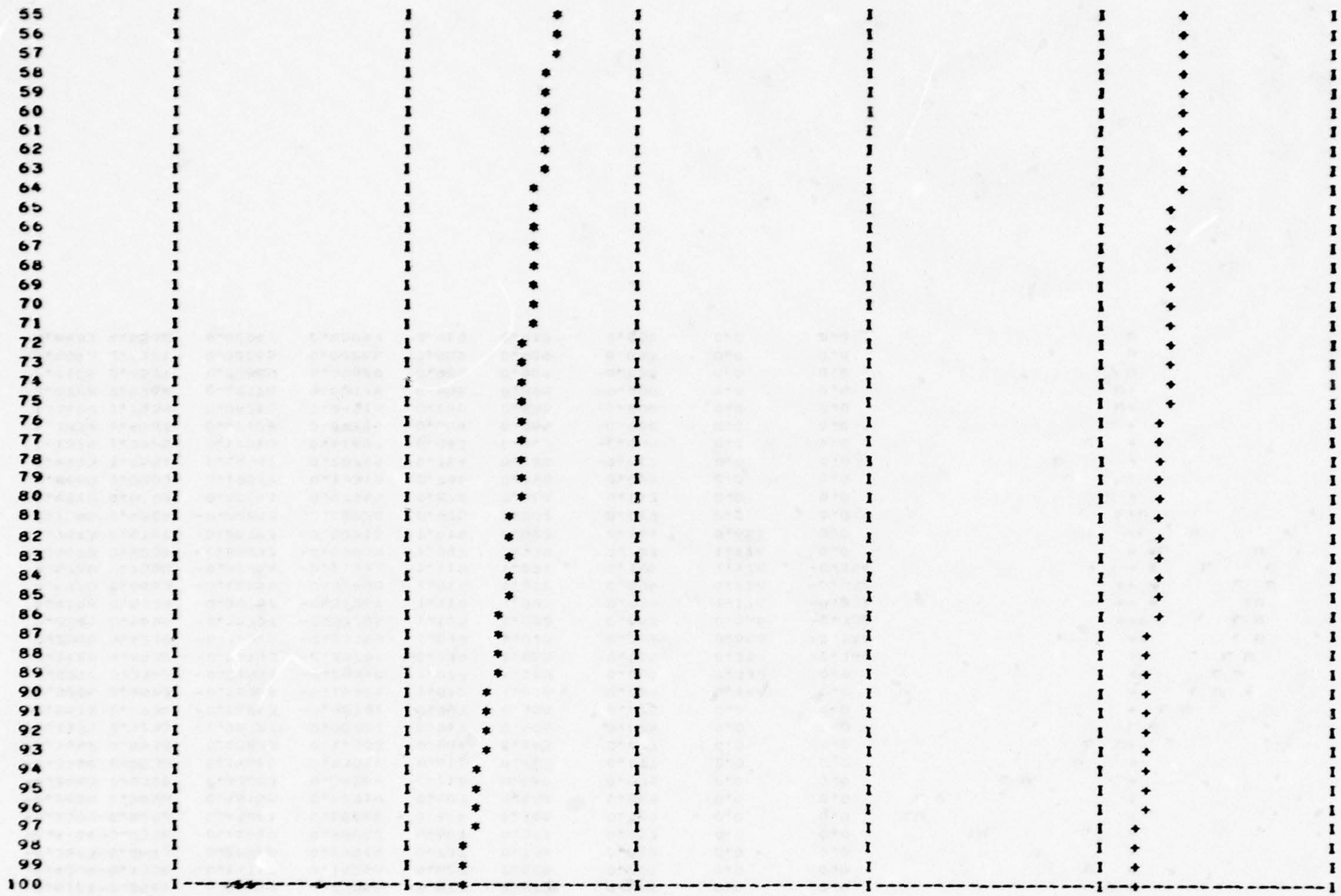
PJUMP RESIDUALS , K=1,KTIP-1

0.1890E-03	0.1848E-03	0.1780E-03	0.1698E-03	0.1605E-03	0.1510E-03
0.1418E-03	0.1328E-03	0.1238E-03	0.1145E-03	0.1042E-03	0.9151E-04
0.7461E-04	0.4896E-04				

ERPLOT FOR FINE MESH

INITIAL ERROR(*) IS 0.1174E-01 INITIAL RESIDUAL(+) IS 0.7929E+01



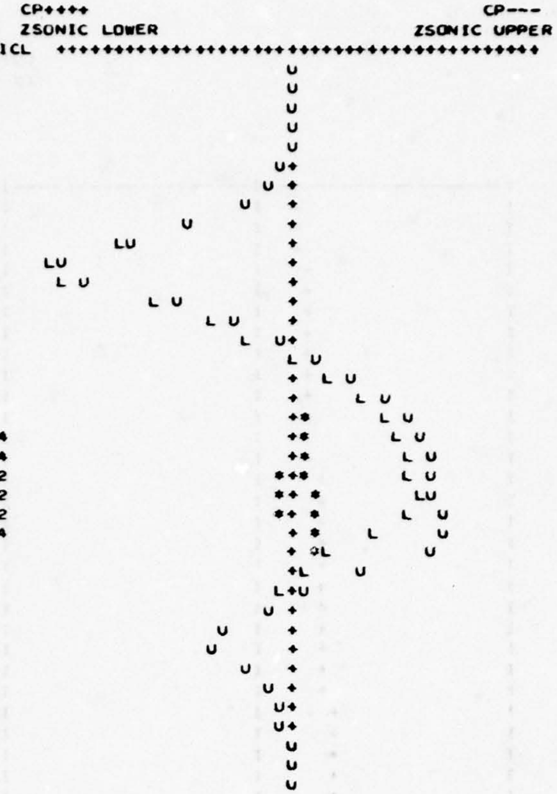


POTENTIAL JUMP AT TRAILING EDGE

0.5285E-01	0.5310E-01	0.5312E-01	0.5282E-01	0.5216E-01	0.5113E-01
0.4969E-01	0.4786E-01	0.4558E-01	0.4279E-01	0.3930E-01	0.3478E-01
0.2855E-01	0.1892E-01				

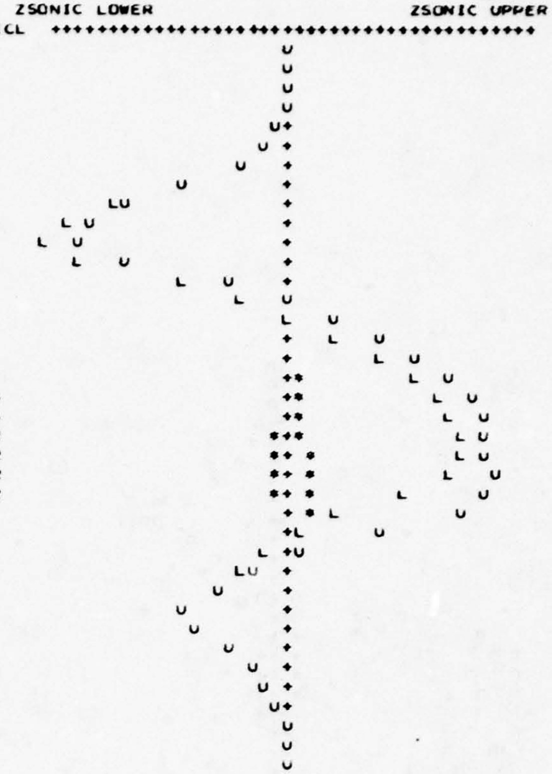
K= 1 SPAN STATION ETA= 0.0 Y= 0.0

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-4.5248	-3.7740	-0.00003	-0.00003	0.910	0.910	0.000	0.0	0.0
3	-3.2209	-2.6150	0.00061	0.00061	0.910	0.910	0.000	0.0	0.0
4	-2.2797	-1.7784	0.00259	0.00259	0.909	0.909	-0.000	0.0	0.0
5	-1.6144	-1.1870	0.00688	0.00688	0.906	0.906	-0.000	0.0	0.0
6	-1.1551	-0.7787	0.01502	0.01502	0.902	0.902	-0.000	0.0	0.0
7	-0.8392	-0.4980	0.02972	0.02971	0.893	0.893	-0.000	0.0	0.0
8	-0.6121	-0.2961	0.06553	0.06555	0.873	0.873	0.000	0.0	0.0
9	-0.4309	-0.1350	0.14112	0.14263	0.827	0.826	0.002	0.0	0.0
10	-0.3513	-0.0643	0.28070	0.29079	0.737	0.730	0.010	0.0	0.0
11	-0.3144	-0.0315	0.45930	0.48680	0.601	0.577	0.027	0.0	0.0
12	-0.2900	-0.0098	0.63684	0.68680	0.424	0.360	0.050	0.0	0.0
13	-0.2680	0.0098	0.56155	0.62919	0.507	0.434	0.068	0.0	0.0
14	-0.2453	0.0300	0.31063	0.38569	0.716	0.660	0.075	0.0	0.0
15	-0.2190	0.0533	0.15910	0.23651	0.816	0.766	0.077	0.0	0.0
16	-0.1842	0.0843	0.03833	0.11503	0.888	0.843	0.077	0.0	0.0
17	-0.1335	0.1293	-0.06727	0.00724	0.947	0.906	0.075	0.0	0.0
18	-0.0618	0.1930	-0.16243	-0.08791	0.997	0.958	0.075	0.0	0.0
19	0.0206	0.2663	-0.25354	-0.18429	1.042	1.008	0.069	0.144	0.0
20	0.0992	0.3362	-0.31931	-0.25510	1.074	1.043	0.064	0.332	0.0
21	0.1746	0.4032	-0.35183	-0.28707	1.089	1.058	0.065	0.332	-0.144
22	0.2508	0.4710	-0.37315	-0.31158	1.099	1.070	0.062	0.656	-0.144
23	0.3295	0.5406	-0.38707	-0.33208	1.105	1.080	0.055	0.656	-0.332
24	0.4106	0.6130	-0.39757	-0.34267	1.110	1.085	0.055	1.176	-0.332
25	0.4930	0.6863	-0.40850	-0.31490	1.115	1.072	0.094	1.176	-0.332
26	0.5738	0.7580	-0.40904	-0.21133	1.115	1.021	0.198	1.176	-0.144
27	0.6470	0.8231	-0.36793	-0.09069	1.097	0.959	0.277	1.176	0.0
28	0.7073	0.8767	-0.20722	-0.02318	1.019	0.923	0.184	0.656	0.0
29	0.7565	0.9204	-0.02685	0.02228	0.925	0.897	0.049	0.0	0.0
30	0.8012	0.9602	0.06641	0.07945	0.872	0.864	0.013	0.0	0.0
31	0.8460	1.0000	0.19077	0.19318	0.796	0.795	0.002	0.0	0.0
32	0.9193	1.0651	0.20987	0.20784	0.784	0.785	-0.002	0.0	0.0
33	1.1076	1.2325	0.11513	0.11497	0.843	0.843	-0.000	0.0	0.0
34	1.3339	1.4337	0.07106	0.07104	0.869	0.869	-0.000	0.0	0.0
35	1.6400	1.7058	0.04216	0.04216	0.886	0.886	-0.000	0.0	0.0
36	2.0788	2.0958	0.02178	0.02178	0.898	0.898	-0.000	0.0	0.0
37	2.7109	2.6577	0.00889	0.00889	0.905	0.905	-0.000	0.0	0.0
38	3.6046	3.4521	0.00265	0.00265	0.909	0.909	0.000	0.0	0.0
39	4.8433	4.5532	0.00047	0.00047	0.910	0.910	0.000	0.0	0.0



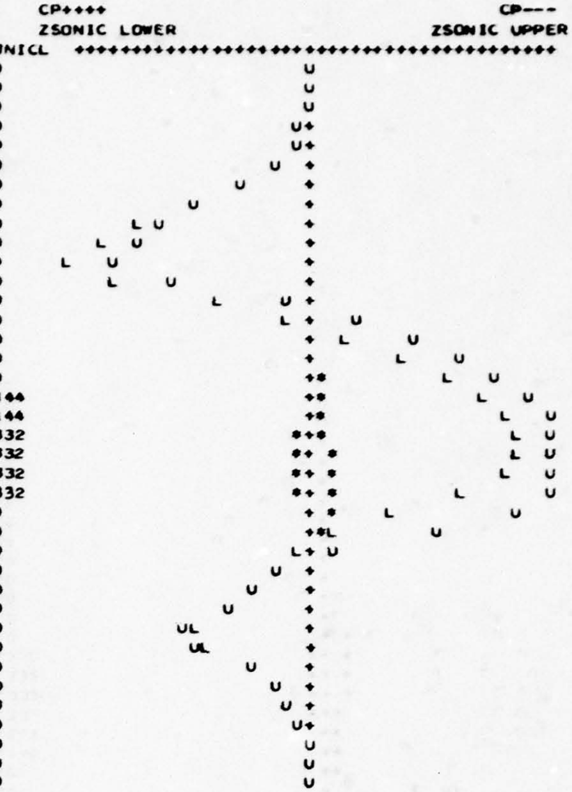
K= 2 SPAN STATION ETA= 0.07407 Y= 0.16667

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-4.1911	-3.7740	0.00004	0.00004	0.910	0.910	0.000	0.0	0.0
3	-2.9516	-2.6150	0.00096	0.00096	0.909	0.909	-0.000	0.0	0.0
4	-2.0569	-1.7784	0.00360	0.00360	0.908	0.908	-0.000	0.0	0.0
5	-1.4245	-1.1870	0.00946	0.00946	0.905	0.905	-0.000	0.0	0.0
6	-0.9878	-0.7787	0.02171	0.02171	0.896	0.896	-0.000	0.0	0.0
7	-0.6875	-0.4980	0.04792	0.04794	0.883	0.883	0.000	0.0	0.0
8	-0.4717	-0.2961	0.10505	0.10579	0.849	0.849	0.001	0.0	0.0
9	-0.2994	-0.1350	0.21229	0.21972	0.782	0.778	0.007	0.0	0.0
10	-0.2237	-0.0643	0.32925	0.35483	0.702	0.683	0.026	0.0	0.0
11	-0.1887	-0.0315	0.40183	0.45161	0.648	0.607	0.050	0.0	0.0
12	-0.1655	-0.0098	0.43928	0.51457	0.617	0.552	0.075	0.0	0.0
13	-0.1445	0.0098	0.32564	0.41920	0.705	0.634	0.094	0.0	0.0
14	-0.1229	0.0300	0.12739	0.22666	0.836	0.773	0.099	0.0	0.0
15	-0.0980	0.0533	0.00175	0.10093	0.909	0.852	0.099	0.0	0.0
16	-0.0649	0.0843	-0.10075	-0.00474	0.965	0.913	0.096	0.0	0.0
17	-0.0167	0.1293	-0.19049	-0.09975	1.011	0.964	0.091	0.0	0.0
18	0.0514	0.1930	-0.26759	-0.18771	1.049	1.009	0.080	0.144	0.0
19	0.1298	0.2663	-0.33552	-0.26591	1.081	1.048	0.070	0.332	0.0
20	0.2045	0.3362	-0.38215	-0.31535	1.103	1.072	0.067	0.656	-0.144
21	0.2762	0.4032	-0.40207	-0.33781	1.112	1.082	0.064	0.656	-0.144
22	0.3487	0.4710	-0.41170	-0.35167	1.117	1.089	0.060	0.656	-0.332
23	0.4234	0.5408	-0.41792	-0.35441	1.120	1.090	0.064	1.176	-0.332
24	0.5005	0.6130	-0.42354	-0.32406	1.122	1.076	0.099	1.176	-0.332
25	0.5789	0.6863	-0.41719	-0.23081	1.119	1.031	0.186	1.176	-0.332
26	0.6557	0.7580	-0.35455	-0.10496	1.090	0.967	0.250	1.176	0.0
27	0.7253	0.8231	-0.18653	-0.01589	1.009	0.919	0.171	0.656	0.0
28	0.7826	0.8767	-0.01315	0.03630	0.917	0.889	0.049	0.0	0.0
29	0.8293	0.9204	0.07646	0.08476	0.866	0.861	0.008	0.0	0.0
30	0.8718	0.9602	0.13880	0.14011	0.829	0.828	0.001	0.0	0.0
31	0.9144	1.0000	0.21921	0.21692	0.778	0.779	-0.002	0.0	0.0
32	0.9841	1.0651	0.20282	0.20040	0.789	0.790	-0.002	0.0	0.0
33	1.1631	1.2325	0.11020	0.11003	0.846	0.846	-0.000	0.0	0.0
34	1.3782	1.4337	0.06729	0.06729	0.872	0.872	0.000	0.0	0.0
35	1.6693	1.7058	0.04066	0.04066	0.887	0.887	0.000	0.0	0.0
36	2.0863	2.0958	0.02155	0.02155	0.898	0.898	0.000	0.0	0.0
37	2.6873	2.6577	0.00910	0.00910	0.905	0.905	0.000	0.0	0.0
38	3.5368	3.4521	0.00285	0.00285	0.908	0.908	0.000	0.0	0.0
39	4.7144	4.5532	0.00056	0.00056	0.910	0.910	0.000	0.0	0.0



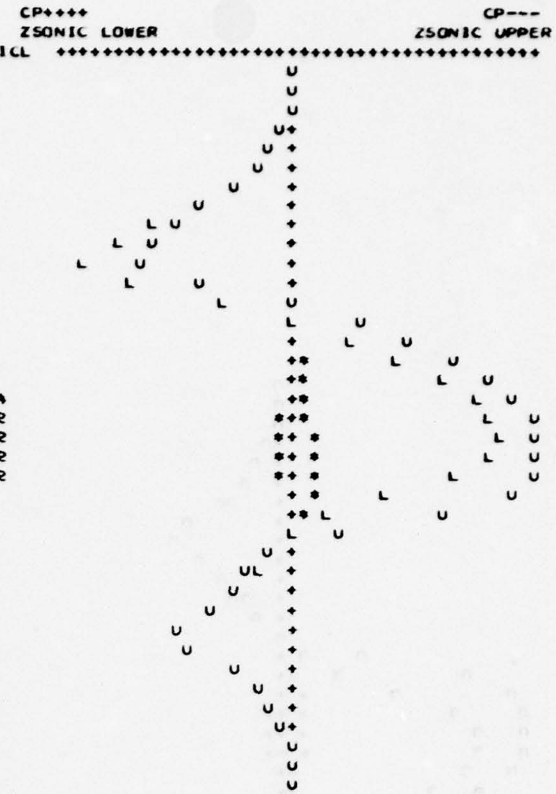
K= 3 SPAN STATION ETA= 0.14815 Y= 0.33333

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-3.8574	-3.7740	0.00015	0.00015	0.910	0.910	0.000	0.0	0.0
3	-2.6824	-2.6150	0.00145	0.00145	0.909	0.909	-0.000	0.0	0.0
4	-1.6341	-1.7784	0.00500	0.00500	0.907	0.907	-0.000	0.0	0.0
5	-1.2345	-1.1870	0.01311	0.01311	0.903	0.903	0.000	0.0	0.0
6	-0.8206	-0.7787	0.03042	0.03043	0.893	0.893	0.000	0.0	0.0
7	-0.5359	-0.4980	0.06402	0.06412	0.873	0.873	0.000	0.0	0.0
8	-0.3312	-0.2961	0.12086	0.12217	0.840	0.839	0.001	0.0	0.0
9	-0.1679	-0.1350	0.20312	0.21348	0.788	0.782	0.010	0.0	0.0
10	-0.0962	-0.0643	0.27836	0.31087	0.738	0.715	0.033	0.0	0.0
11	-0.0629	-0.0315	0.32291	0.38325	0.707	0.662	0.060	0.0	0.0
12	-0.0409	-0.0098	0.35439	0.44306	0.684	0.614	0.089	0.0	0.0
13	-0.0211	0.0098	0.24423	0.35388	0.761	0.684	0.110	0.0	0.0
14	-0.0006	0.0300	0.04882	0.16625	0.882	0.812	0.117	0.0	0.0
15	0.0231	0.0533	-0.07721	0.04137	0.952	0.887	0.119	0.0	0.0
16	0.0544	0.0843	-0.18216	-0.06589	1.007	0.946	0.116	0.0	0.0
17	0.1001	0.1293	-0.26763	-0.16440	1.049	0.998	0.103	0.144	0.0
18	0.1647	0.1930	-0.33473	-0.24973	1.081	1.040	0.085	0.332	0.0
19	0.2390	0.2663	-0.39420	-0.31910	1.109	1.074	0.075	0.332	-0.144
20	0.3098	0.3362	-0.43389	-0.36285	1.127	1.094	0.071	0.656	-0.144
21	0.3778	0.4032	-0.44819	-0.37947	1.133	1.102	0.069	0.656	-0.332
22	0.4465	0.4710	-0.45207	-0.37961	1.135	1.102	0.072	1.176	-0.332
23	0.5174	0.5408	-0.45276	-0.35115	1.135	1.089	0.102	1.176	-0.332
24	0.5905	0.6130	-0.44469	-0.26647	1.132	1.048	0.178	1.176	-0.332
25	0.6648	0.6863	-0.38769	-0.13808	1.106	0.984	0.250	1.176	0.0
26	0.7376	0.7580	-0.22322	-0.03574	1.027	0.930	0.187	0.656	0.0
27	0.8036	0.8231	-0.03701	0.02179	0.930	0.898	0.059	0.0	0.0
28	0.8579	0.8767	0.06098	0.06623	0.875	0.872	0.005	0.0	0.0
29	0.9022	0.9204	0.10998	0.10869	0.846	0.847	-0.001	0.0	0.0
30	0.9425	0.9602	0.15651	0.15475	0.818	0.819	-0.002	0.0	0.0
31	0.9829	1.0000	0.22429	0.22100	0.775	0.777	-0.003	0.0	0.0
32	1.0489	1.0651	0.20242	0.19988	0.789	0.790	-0.003	0.0	0.0
33	1.2187	1.2325	0.10929	0.10912	0.847	0.847	-0.000	0.0	0.0
34	1.4226	1.4337	0.06580	0.06580	0.872	0.872	0.000	0.0	0.0
35	1.6985	1.7058	0.03990	0.03990	0.887	0.887	0.000	0.0	0.0
36	2.0939	2.0958	0.02146	0.02147	0.898	0.898	0.000	0.0	0.0
37	2.6636	2.6577	0.00931	0.00931	0.905	0.905	0.000	0.0	0.0
38	3.4690	3.4521	0.00306	0.00306	0.908	0.908	0.000	0.0	0.0
39	4.5854	4.5532	0.00066	0.00066	0.910	0.910	0.000	0.0	0.0



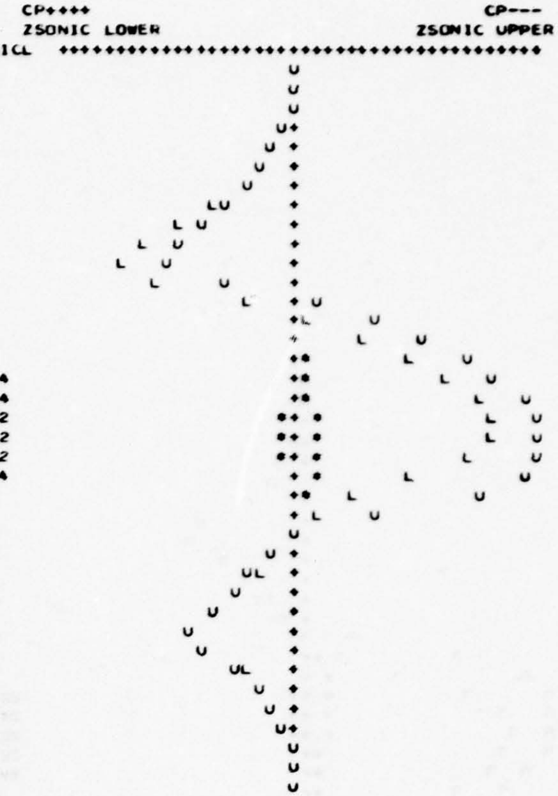
K= 4 SPAN STATION ETA= 0.22222 Y= 0.50000

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-3.5238	-3.7740	0.00033	0.00033	0.910	0.910	0.000	0.0	0.0
3	-2.4131	-2.6150	0.00214	0.00214	0.909	0.909	-0.000	0.0	0.0
4	-1.6113	-1.7784	0.00690	0.00690	0.906	0.906	0.000	0.0	0.0
5	-1.0446	-1.1870	0.01751	0.01751	0.900	0.900	0.000	0.0	0.0
6	-0.6533	-0.7787	0.03817	0.03819	0.888	0.888	0.000	0.0	0.0
7	-0.3842	-0.4980	0.07110	0.07127	0.869	0.869	0.000	0.0	0.0
8	-0.1908	-0.2961	0.11547	0.11723	0.843	0.842	0.002	0.0	0.0
9	-0.0364	-0.1350	0.17466	0.18727	0.806	0.798	0.013	0.0	0.0
10	0.0314	-0.0643	0.23298	0.27078	0.769	0.743	0.038	0.0	0.0
11	0.0628	-0.0315	0.27311	0.34128	0.742	0.693	0.068	0.0	0.0
12	0.0836	-0.0098	0.30391	0.40205	0.720	0.647	0.098	0.0	0.0
13	0.1024	0.0098	0.19371	0.31502	0.794	0.712	0.121	0.0	0.0
14	0.1217	0.0300	-0.00265	0.12904	0.911	0.835	0.132	0.0	0.0
15	0.1441	0.0533	-0.13233	0.00304	0.981	0.908	0.135	0.0	0.0
16	0.1737	0.0843	-0.23823	-0.10753	1.035	0.968	0.131	0.144	0.0
17	0.2169	0.1293	-0.32039	-0.20938	1.074	1.020	0.111	0.332	0.0
18	0.2780	0.1930	-0.38438	-0.29259	1.104	1.061	0.092	0.332	0.0
19	0.3482	0.2663	-0.44052	-0.35764	1.130	1.092	0.083	0.656	-0.144
20	0.4151	0.3362	-0.47752	-0.39836	1.146	1.111	0.079	0.656	-0.332
21	0.4794	0.4032	-0.48989	-0.40635	1.152	1.114	0.084	1.176	-0.332
22	0.5443	0.4710	-0.49021	-0.38363	1.152	1.104	0.107	1.176	-0.332
23	0.6113	0.5408	-0.48145	-0.31175	1.148	1.070	0.170	1.176	-0.332
24	0.6804	0.6130	-0.43957	-0.18584	1.129	1.009	0.254	1.176	0.0
25	0.7507	0.6863	-0.29892	-0.07151	1.064	0.949	0.227	0.656	0.0
26	0.8194	0.7580	-0.09276	-0.00652	0.960	0.914	0.086	0.0	0.0
27	0.8818	0.8231	0.03627	0.03907	0.889	0.888	0.003	0.0	0.0
28	0.9332	0.8767	0.08363	0.07880	0.862	0.865	-0.005	0.0	0.0
29	0.9751	0.9204	0.12082	0.11725	0.840	0.842	-0.004	0.0	0.0
30	1.0132	0.9602	0.16220	0.15963	0.814	0.816	-0.003	0.0	0.0
31	1.0513	1.0000	0.22571	0.22216	0.774	0.776	-0.004	0.0	0.0
32	1.1137	1.0651	0.20255	0.19998	0.789	0.790	-0.003	0.0	0.0
33	1.2742	1.2525	0.10963	0.10944	0.847	0.847	-0.003	0.0	0.0
34	1.4669	1.4337	0.06537	0.06538	0.873	0.873	0.000	0.0	0.0
35	1.7277	1.7058	0.03960	0.03960	0.888	0.888	0.000	0.0	0.0
36	2.1015	2.0958	0.02148	0.02149	0.898	0.898	0.000	0.0	0.0
37	2.6400	2.6577	0.00953	0.00953	0.905	0.905	0.000	0.0	0.0
38	3.4012	3.4521	0.00327	0.00327	0.908	0.908	0.000	0.0	0.0
39	4.4565	4.5532	0.00077	0.00076	0.910	0.910	-0.000	0.0	0.0



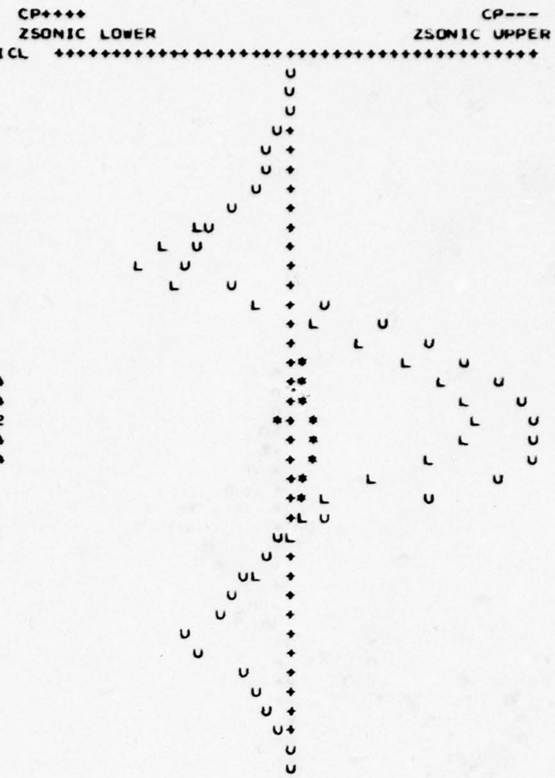
K= 5 SPAN STATION ETA= 0.29630 Y= 0.66667

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-3.1901	-3.7740	0.00060	0.00060	0.910	0.910	0.000	0.0	0.0
3	-2.1438	-2.6150	0.00306	0.00308	0.908	0.908	0.000	0.0	0.0
4	-1.3885	-1.7764	0.00919	0.00919	0.905	0.905	0.000	0.0	0.0
5	-0.8546	-1.1870	0.02167	0.02168	0.898	0.898	0.000	0.0	0.0
6	-0.4860	-0.7767	0.04227	0.04229	0.886	0.886	0.000	0.0	0.0
7	-0.2325	-0.4980	0.06856	0.06879	0.871	0.871	0.000	0.0	0.0
8	-0.0503	-0.2961	0.09951	0.10172	0.853	0.851	0.002	0.0	0.0
9	0.0951	-0.1350	0.14579	0.16051	0.824	0.815	0.015	0.0	0.0
10	0.1590	-0.0643	0.19797	0.24034	0.792	0.764	0.042	0.0	0.0
11	0.1886	-0.0315	0.23636	0.31072	0.767	0.716	0.074	0.0	0.0
12	0.2082	-0.0098	0.26563	0.37070	0.747	0.672	0.105	0.0	0.0
13	0.2258	0.0098	0.15548	0.28521	0.818	0.733	0.130	0.0	0.0
14	0.2441	0.0300	-0.04083	0.10166	0.933	0.851	0.142	0.0	0.0
15	0.2651	0.0533	-0.17343	-0.02681	1.002	0.924	0.149	0.0	0.0
16	0.2931	0.0843	-0.27846	-0.13816	1.054	0.984	0.140	0.144	0.0
17	0.3337	0.1293	-0.35869	-0.24017	1.092	1.036	0.119	0.332	0.0
18	0.3913	0.1930	-0.42322	-0.32129	1.122	1.075	0.102	0.656	-0.144
19	0.4574	0.2663	-0.47822	-0.38431	1.147	1.104	0.094	0.656	-0.144
20	0.5205	0.3362	-0.51474	-0.41904	1.163	1.120	0.096	1.176	-0.332
21	0.5810	0.4032	-0.52652	-0.41149	1.168	1.117	0.115	1.176	-0.332
22	0.6422	0.4710	-0.52199	-0.35608	1.166	1.091	0.166	1.176	-0.332
23	0.7053	0.5408	-0.49363	-0.24454	1.153	1.038	0.249	1.176	-0.144
24	0.7704	0.6130	-0.39346	-0.12204	1.108	0.976	0.271	0.656	0.0
25	0.8365	0.6863	-0.18050	-0.04340	1.006	0.934	0.137	0.144	0.0
26	0.9013	0.7580	-0.00443	0.00481	0.912	0.907	0.009	0.0	0.0
27	0.9601	0.8231	0.05469	0.04632	0.879	0.884	-0.008	0.0	0.0
28	1.0085	0.8767	0.08989	0.08396	0.858	0.862	-0.006	0.0	0.0
29	1.0479	0.9204	0.12439	0.12080	0.836	0.840	-0.004	0.0	0.0
30	1.0838	0.9602	0.16422	0.16174	0.813	0.815	-0.002	0.0	0.0
31	1.1198	1.0000	0.22553	0.22204	0.774	0.776	-0.003	0.0	0.0
32	1.1786	1.0651	0.20230	0.19974	0.789	0.790	-0.003	0.0	0.0
33	1.3297	1.2325	0.11034	0.11015	0.846	0.846	-0.000	0.0	0.0
34	1.5113	1.4337	0.06551	0.06552	0.873	0.873	0.000	0.0	0.0
35	1.7570	1.7058	0.03959	0.03960	0.888	0.888	0.000	0.0	0.0
36	2.1090	2.0958	0.02157	0.02157	0.898	0.898	0.000	0.0	0.0
37	2.6163	2.6577	0.00974	0.00974	0.905	0.905	0.000	0.0	0.0
38	3.3335	3.4521	0.00349	0.00349	0.908	0.908	0.000	0.0	0.0
39	4.3275	4.5532	0.00089	0.00088	0.910	0.910	-0.000	0.0	0.0



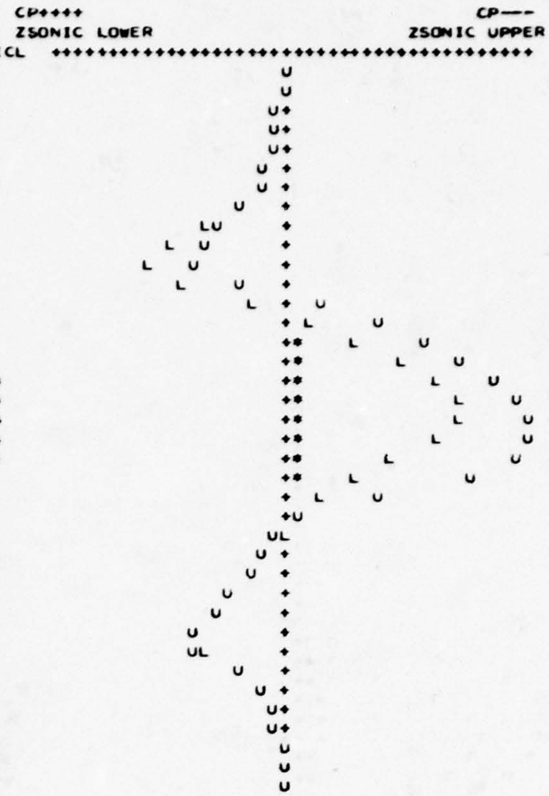
K= 6   SPAN STATION   ETA= 0.37037   Y=   0.83333

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-2.8564	-3.7740	0.00101	0.00101	0.909	0.909	0.000	0.0	0.0
3	-1.8745	-2.6150	0.00428	0.00428	0.908	0.908	0.000	0.0	0.0
4	-1.1657	-1.7784	0.01157	0.01157	0.904	0.904	0.000	0.0	0.0
5	-0.6647	-1.1870	0.02445	0.02446	0.896	0.896	0.000	0.0	0.0
6	-0.3188	-0.7787	0.04160	0.04164	0.886	0.886	0.000	0.0	0.0
7	-0.0809	-0.4980	0.05910	0.05941	0.876	0.876	0.000	0.0	0.0
8	0.0901	-0.2961	0.08022	0.08294	0.864	0.862	0.003	0.0	0.0
9	0.2266	-0.1350	0.12058	0.13747	0.840	0.830	0.017	0.0	0.0
10	0.2865	-0.0643	0.17018	0.21686	0.809	0.779	0.047	0.0	0.0
11	0.3143	-0.0315	0.20678	0.28657	0.786	0.732	0.080	0.0	0.0
12	0.3327	-0.0098	0.23417	0.34493	0.768	0.691	0.111	0.0	0.0
13	0.3493	0.0098	0.12471	0.26132	0.837	0.750	0.137	0.0	0.0
14	0.3664	0.0300	-0.07029	0.08153	0.948	0.863	0.152	0.0	0.0
15	0.3862	0.0533	-0.20309	-0.04403	1.017	0.934	0.159	0.144	0.0
16	0.4124	0.0843	-0.30722	-0.15826	1.068	0.995	0.149	0.144	0.0
17	0.4505	0.1293	-0.38797	-0.25941	1.106	1.045	0.129	0.332	0.0
18	0.5045	0.1930	-0.45395	-0.33799	1.136	1.083	0.116	0.656	-0.144
19	0.5666	0.2663	-0.50898	-0.39673	1.160	1.110	0.112	0.656	-0.144
20	0.6258	0.3362	-0.54556	-0.42054	1.176	1.121	0.125	1.176	-0.332
21	0.6826	0.4032	-0.55585	-0.39070	1.181	1.107	0.165	1.176	-0.144
22	0.7400	0.4710	-0.54115	-0.30442	1.174	1.067	0.237	1.176	-0.144
23	0.7992	0.5408	-0.47670	-0.18280	1.146	1.007	0.294	0.656	0.0
24	0.8603	0.6130	-0.30202	-0.08965	1.066	0.959	0.212	0.656	0.0
25	0.9224	0.6863	-0.08562	-0.03701	0.957	0.930	0.049	0.0	0.0
26	0.9832	0.7580	0.02540	0.00818	0.896	0.905	-0.017	0.0	0.0
27	1.0384	0.8231	0.06027	0.04904	0.876	0.882	-0.011	0.0	0.0
28	1.0838	0.8767	0.09228	0.08618	0.857	0.860	-0.006	0.0	0.0
29	1.1208	0.9204	0.12592	0.12251	0.837	0.839	-0.003	0.0	0.0
30	1.1545	0.9602	0.16496	0.16267	0.813	0.814	-0.002	0.0	0.0
31	1.1882	1.0000	0.22448	0.22110	0.774	0.777	-0.003	0.0	0.0
32	1.2434	1.0651	0.20165	0.19910	0.789	0.791	-0.003	0.0	0.0
33	1.3852	1.2325	0.11119	0.11099	0.846	0.846	-0.000	0.0	0.0
34	1.5556	1.4337	0.06596	0.06597	0.872	0.872	0.000	0.0	0.0
35	1.7862	1.7058	0.03977	0.03977	0.887	0.887	0.000	0.0	0.0
36	2.1166	2.0958	0.02170	0.02170	0.898	0.898	0.000	0.0	0.0
37	2.5927	2.6577	0.00995	0.00996	0.904	0.904	0.000	0.0	0.0
38	3.2657	3.4521	0.00371	0.00371	0.908	0.908	0.000	0.0	0.0
39	4.1985	4.5532	0.00102	0.00100	0.909	0.909	-0.000	0.0	0.0



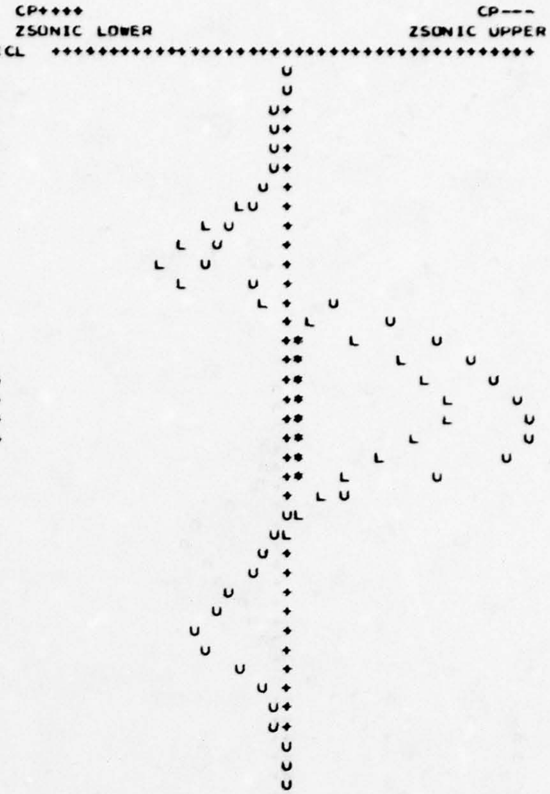
K= 7 SPAN STATION ETA= 0.44444 Y= 1.00000

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-2.5228	-3.7740	0.00157	0.00157	0.909	0.909	0.000	0.0	0.0
3	-1.6052	-2.6150	0.00565	0.00565	0.907	0.907	0.000	0.0	0.0
4	-0.9429	-1.7764	0.01354	0.01354	0.902	0.902	0.000	0.0	0.0
5	-0.4747	-1.1870	0.02497	0.02497	0.896	0.896	0.000	0.0	0.0
6	-0.1515	-0.7787	0.03653	0.03658	0.889	0.889	0.000	0.0	0.0
7	0.0708	-0.4980	0.04599	0.04640	0.884	0.884	0.000	0.0	0.0
8	0.2306	-0.2961	0.06159	0.06492	0.875	0.873	0.003	0.0	0.0
9	0.3581	-0.1350	0.09988	0.11922	0.852	0.841	0.019	0.0	0.0
10	0.4141	-0.0643	0.14781	0.19915	0.823	0.791	0.051	0.0	0.0
11	0.4401	-0.0315	0.18224	0.26772	0.802	0.745	0.065	0.0	0.0
12	0.4573	-0.0098	0.20740	0.32410	0.786	0.706	0.117	0.0	0.0
13	0.4727	0.0098	0.09921	0.24302	0.853	0.762	0.144	0.0	0.0
14	0.4887	0.0300	-0.09321	0.06856	0.961	0.871	0.162	0.0	0.0
15	0.5072	0.0533	-0.22360	-0.05448	1.027	0.940	0.169	0.144	0.0
16	0.5317	0.0843	-0.32699	-0.16738	1.077	0.999	0.160	0.332	0.0
17	0.5674	0.1293	-0.41035	-0.26650	1.116	1.048	0.144	0.656	0.0
18	0.6178	0.1930	-0.47793	-0.34135	1.146	1.084	0.137	0.656	-0.144
19	0.6758	0.2663	-0.53324	-0.39269	1.171	1.108	0.141	0.656	-0.144
20	0.7311	0.3362	-0.56910	-0.40169	1.186	1.112	0.167	0.656	-0.144
21	0.7842	0.4032	-0.57495	-0.35028	1.189	1.088	0.225	0.656	-0.144
22	0.8378	0.4710	-0.54166	-0.25060	1.174	1.041	0.291	0.656	-0.144
23	0.8932	0.5408	-0.42708	-0.14922	1.124	0.990	0.278	0.656	0.0
24	0.9503	0.6130	-0.20276	-0.08347	1.017	0.956	0.119	0.144	0.0
25	1.0063	0.6862	-0.02628	-0.03643	0.925	0.930	-0.010	0.0	0.0
26	1.0651	0.7580	0.02717	0.00916	0.895	0.905	-0.018	0.0	0.0
27	1.1166	0.8231	0.05890	0.05028	0.876	0.881	-0.009	0.0	0.0
28	1.1590	0.8767	0.09157	0.08744	0.857	0.860	-0.004	0.0	0.0
29	1.1937	0.9204	0.12564	0.12354	0.837	0.838	-0.002	0.0	0.0
30	1.2251	0.9602	0.16451	0.16304	0.813	0.814	-0.001	0.0	0.0
31	1.2567	1.0000	0.22261	0.21958	0.776	0.778	-0.003	0.0	0.0
32	1.3082	1.0651	0.20063	0.19813	0.790	0.792	-0.003	0.0	0.0
33	1.4408	1.2325	0.11212	0.11192	0.845	0.845	-0.000	0.0	0.0
34	1.6000	1.4337	0.06662	0.06664	0.872	0.872	0.000	0.0	0.0
35	1.8154	1.7058	0.04005	0.04006	0.887	0.887	0.000	0.0	0.0
36	2.1242	2.0958	0.02182	0.02183	0.898	0.898	0.000	0.0	0.0
37	2.5690	2.6577	0.01015	0.01015	0.904	0.904	0.000	0.0	0.0
38	3.1979	3.4521	0.00394	0.00394	0.908	0.908	0.000	0.0	0.0
39	4.0696	4.5532	0.00118	0.00113	0.909	0.909	-0.000	0.0	0.0



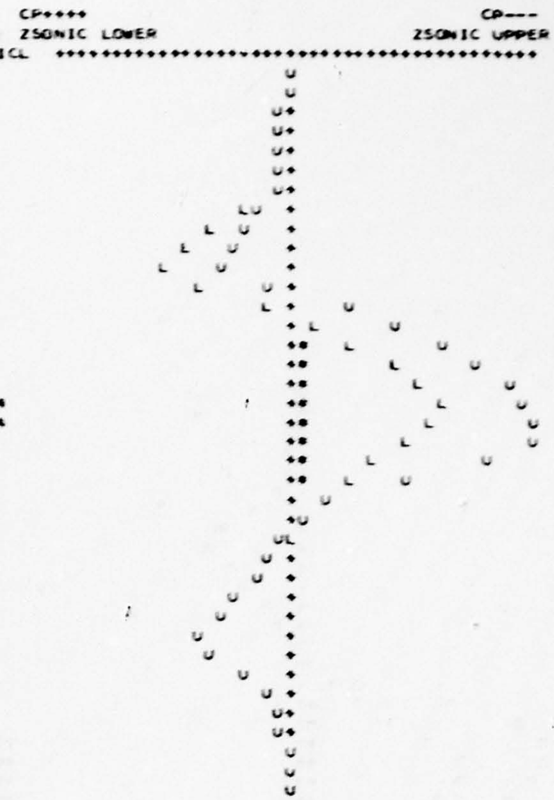
K= 8 SPAN STATION ETA= 0.51852 Y= 1.16667

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-2.1891	-3.7740	0.00228	0.00228	0.909	0.909	0.000	0.0	0.0
3	-1.3360	-2.6150	0.00700	0.00700	0.906	0.906	0.000	0.0	0.0
4	-0.7201	-1.7764	0.01457	0.01457	0.902	0.902	0.000	0.0	0.0
5	-0.2848	-1.1870	0.02288	0.02289	0.897	0.897	0.000	0.0	0.0
6	0.0158	-0.7787	0.02831	0.02838	0.894	0.894	0.000	0.0	0.0
7	0.2224	-0.4980	0.03212	0.03265	0.892	0.892	0.001	0.0	0.0
8	0.3710	-0.2961	0.04585	0.04999	0.884	0.882	0.004	0.0	0.0
9	0.4896	-0.1350	0.08395	0.10638	0.862	0.848	0.022	0.0	0.0
10	0.5417	-0.0643	0.13008	0.18717	0.834	0.799	0.057	0.0	0.0
11	0.5658	-0.0315	0.16172	0.25434	0.815	0.755	0.093	0.0	0.0
12	0.5818	-0.0098	0.18415	0.30854	0.800	0.717	0.124	0.0	0.0
13	0.5962	0.0098	0.07772	0.23087	0.865	0.770	0.153	0.0	0.0
14	0.6111	0.0300	-0.11069	0.06353	0.970	0.874	0.174	0.0	0.0
15	0.6283	0.0533	-0.23835	-0.05517	1.035	0.940	0.183	0.144	0.0
16	0.6510	0.0843	-0.34096	-0.16435	1.084	0.998	0.177	0.332	0.0
17	0.6842	0.1293	-0.42646	-0.26039	1.123	1.045	0.166	0.656	0.0
18	0.7311	0.1930	-0.49547	-0.33105	1.154	1.079	0.164	0.656	-0.144
19	0.7850	0.2663	-0.55052	-0.37376	1.178	1.099	0.177	0.656	-0.144
20	0.8364	0.3362	-0.58376	-0.36972	1.192	1.097	0.214	0.656	-0.144
21	0.8858	0.4032	-0.58012	-0.30846	1.191	1.069	0.272	0.656	-0.144
22	0.9357	0.4710	-0.51778	-0.21703	1.164	1.024	0.301	0.656	0.0
23	0.9871	0.5408	-0.34922	-0.13909	1.088	0.985	0.210	0.332	0.0
24	1.0402	0.6130	-0.12912	-0.08553	0.980	0.957	0.044	0.0	0.0
25	1.0942	0.6862	-0.01048	-0.03716	0.916	0.931	-0.027	0.0	0.0
26	1.1470	0.7580	0.02284	0.00955	0.897	0.905	-0.013	0.0	0.0
27	1.1949	0.8231	0.05653	0.05115	0.878	0.881	-0.005	0.0	0.0
28	1.2343	0.8767	0.09060	0.08844	0.858	0.859	-0.002	0.0	0.0
29	1.2665	0.9204	0.12526	0.12435	0.837	0.836	-0.001	0.0	0.0
30	1.2958	0.9602	0.16396	0.16316	0.813	0.814	-0.001	0.0	0.0
31	1.3251	1.0000	0.22054	0.21775	0.777	0.779	-0.003	0.0	0.0
32	1.3731	1.0651	0.19952	0.19702	0.791	0.792	-0.003	0.0	0.0
33	1.4963	1.2325	0.11321	0.11300	0.844	0.844	-0.000	0.0	0.0
34	1.6443	1.4337	0.06743	0.06745	0.871	0.871	0.000	0.0	0.0
35	1.8447	1.7058	0.04035	0.04037	0.887	0.887	0.000	0.0	0.0
36	2.1317	2.0958	0.02191	0.02191	0.898	0.898	0.000	0.0	0.0
37	2.5454	2.6577	0.01032	0.01032	0.904	0.904	0.000	0.0	0.0
38	3.1301	3.4521	0.00417	0.00417	0.908	0.908	0.000	0.0	0.0
39	3.9406	4.5532	0.00135	0.00128	0.909	0.909	-0.000	0.0	0.0



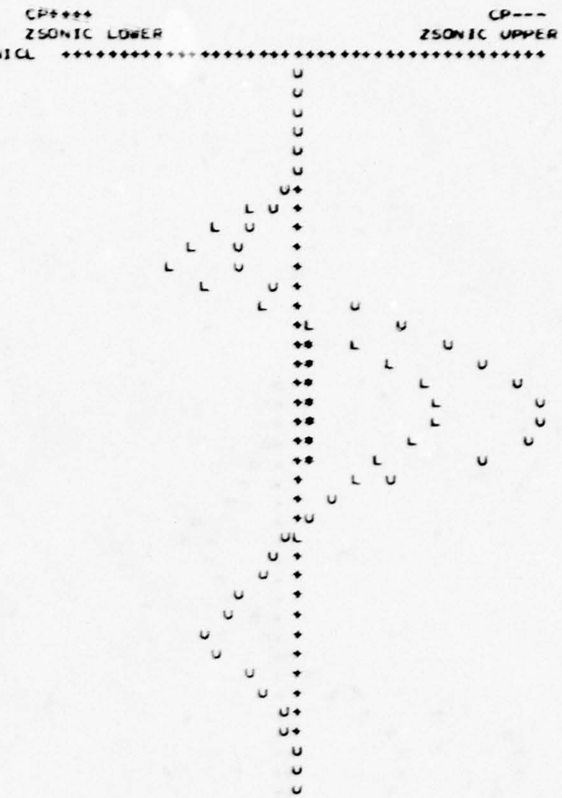
K= 9   SPAN STATION   ETA= 0.59259   Y= 1.33333

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-1.6554	-3.7740	0.00312	0.00312	0.908	0.908	0.000	0.0	0.0
3	-1.0667	-2.6150	0.00807	0.00807	0.905	0.905	0.000	0.0	0.0
4	-0.4973	-1.7764	0.01423	0.01424	0.902	0.902	0.000	0.0	0.0
5	-0.0948	-1.1670	0.01844	0.01845	0.900	0.900	0.000	0.0	0.0
6	0.1830	-0.7767	0.01864	0.01873	0.900	0.899	0.000	0.0	0.0
7	0.3741	-0.4960	0.01972	0.02045	0.899	0.898	0.001	0.0	0.0
8	0.5115	-0.2961	0.03424	0.03957	0.891	0.888	0.005	0.0	0.0
9	0.6211	-0.1350	0.07268	0.09937	0.868	0.853	0.027	0.0	0.0
10	0.6693	-0.0643	0.11612	0.18106	0.843	0.802	0.065	0.0	0.0
11	0.6916	-0.0315	0.14406	0.24659	0.826	0.760	0.103	0.0	0.0
12	0.7063	-0.0098	0.16302	0.29845	0.814	0.724	0.135	0.0	0.0
13	0.7197	0.0098	0.05868	0.22510	0.877	0.774	0.166	0.0	0.0
14	0.7334	0.0300	-0.12450	0.06664	0.977	0.872	0.191	0.0	0.0
15	0.7493	0.0533	-0.24887	-0.04609	1.040	0.935	0.203	0.144	0.0
16	0.7703	0.0843	-0.35013	-0.14981	1.088	0.990	0.200	0.332	0.0
17	0.8010	0.1293	-0.43679	-0.24276	1.128	1.037	0.194	0.656	0.0
18	0.8444	0.1930	-0.50652	-0.31059	1.159	1.070	0.196	0.656	0.0
19	0.8942	0.2663	-0.56016	-0.34723	1.182	1.087	0.213	0.656	-0.144
20	0.9418	0.3362	-0.58812	-0.33783	1.194	1.083	0.250	0.656	-0.144
21	0.9874	0.4032	-0.56970	-0.27999	1.186	1.055	0.290	0.656	0.0
22	1.0335	0.4710	-0.47374	-0.20396	1.145	1.018	0.270	0.656	0.0
23	1.0811	0.5408	-0.27318	-0.13948	1.052	0.985	0.134	0.332	0.0
24	1.1301	0.6130	-0.08604	-0.08779	0.958	0.958	0.000	0.0	0.0
25	1.1800	0.6862	-0.01539	-0.03739	0.919	0.931	-0.022	0.0	0.0
26	1.2289	0.7580	0.01802	0.01018	0.900	0.904	-0.008	0.0	0.0
27	1.2732	0.8231	0.05457	0.05218	0.879	0.880	-0.002	0.0	0.0
28	1.3096	0.8767	0.09016	0.08959	0.858	0.858	-0.001	0.0	0.0
29	1.3394	0.9204	0.12535	0.12526	0.837	0.837	-0.000	0.0	0.0
30	1.3664	0.9602	0.16374	0.16329	0.813	0.814	-0.000	0.0	0.0
31	1.3936	1.0000	0.21855	0.21581	0.778	0.780	-0.003	0.0	0.0
32	1.4379	1.0651	0.19852	0.19596	0.791	0.793	-0.003	0.0	0.0
33	1.5518	1.2325	0.11454	0.11432	0.844	0.844	-0.000	0.0	0.0
34	1.6887	1.4337	0.06833	0.06836	0.871	0.871	0.000	0.0	0.0
35	1.8739	1.7058	0.04058	0.04059	0.887	0.887	0.000	0.0	0.0
36	2.1393	2.0958	0.02189	0.02190	0.898	0.898	0.000	0.0	0.0
37	2.5217	2.6577	0.01045	0.01045	0.904	0.904	0.000	0.0	0.0
38	3.0623	3.4521	0.00440	0.00440	0.908	0.908	0.000	0.0	0.0
39	3.8117	4.5532	0.00154	0.00144	0.909	0.909	-0.000	0.0	0.0



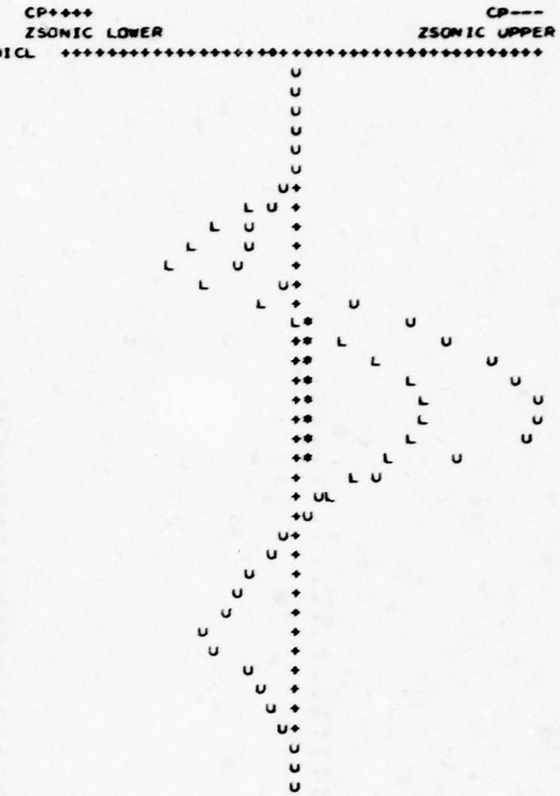
K=10 SPAN STATION ETA= 0.66667 Y= 1.50000

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-1.5216	-3.7740	0.00398	0.00398	0.908	0.908	0.000	0.0	0.0
3	-0.7974	-2.6150	0.00856	0.00856	0.905	0.905	0.000	0.0	0.0
4	-0.2745	-1.7764	0.01238	0.01239	0.903	0.903	0.000	0.0	0.0
5	0.0951	-1.1670	0.01240	0.01242	0.903	0.903	0.000	0.0	0.0
6	0.3503	-0.7787	0.00924	0.00938	0.905	0.905	0.000	0.0	0.0
7	0.5258	-0.4980	0.01038	0.01143	0.904	0.904	0.001	0.0	0.0
8	0.6519	-0.2961	0.02718	0.03429	0.895	0.891	0.007	0.0	0.0
9	0.7526	-0.1350	0.06537	0.09793	0.873	0.854	0.033	0.0	0.0
10	0.7968	-0.0643	0.10470	0.18006	0.849	0.803	0.075	0.0	0.0
11	0.8173	-0.0315	0.12796	0.24345	0.835	0.762	0.115	0.0	0.0
12	0.8309	-0.0098	0.14287	0.29264	0.826	0.728	0.150	0.0	0.0
13	0.8431	0.0096	0.04101	0.22418	0.887	0.775	0.183	0.0	0.0
14	0.8557	0.0300	-0.13560	0.07583	0.983	0.867	0.211	0.0	0.0
15	0.8703	0.0533	-0.25593	-0.03009	1.043	0.927	0.226	0.332	0.0
16	0.8897	0.0843	-0.35498	-0.12797	1.091	0.979	0.227	0.332	0.0
17	0.9178	0.1293	-0.44155	-0.21697	1.130	1.025	0.223	0.656	0.0
18	0.9576	0.1930	-0.51097	-0.28681	1.161	1.058	0.224	0.656	0.0
19	1.0035	0.2663	-0.56197	-0.32222	1.183	1.075	0.240	0.656	0.0
20	1.0471	0.3362	-0.58246	-0.31510	1.192	1.072	0.267	0.656	0.0
21	1.0890	0.4032	-0.54683	-0.26634	1.177	1.048	0.280	0.656	0.0
22	1.1313	0.4710	-0.42302	-0.20157	1.122	1.016	0.221	0.332	0.0
23	1.1750	0.5408	-0.21622	-0.14159	1.025	0.986	0.077	0.144	0.0
24	1.2201	0.6130	-0.07197	-0.08852	0.949	0.958	-0.017	0.0	0.0
25	1.2659	0.6863	-0.02346	-0.03672	0.923	0.930	-0.013	0.0	0.0
26	1.3108	0.7580	0.01508	0.01146	0.902	0.904	-0.004	0.0	0.0
27	1.3515	0.8231	0.05461	0.05379	0.879	0.879	-0.001	0.0	0.0
28	1.3849	0.8767	0.09145	0.09127	0.857	0.857	-0.000	0.0	0.0
29	1.4123	0.9204	0.12684	0.12661	0.836	0.836	-0.000	0.0	0.0
30	1.4371	0.9602	0.16454	0.16373	0.813	0.813	-0.001	0.0	0.0
31	1.4620	1.0000	0.21712	0.21403	0.779	0.781	-0.003	0.0	0.0
32	1.5027	1.0651	0.19791	0.19514	0.792	0.793	-0.003	0.0	0.0
33	1.6073	1.2325	0.11617	0.11590	0.843	0.843	-0.000	0.0	0.0
34	1.7331	1.4337	0.06915	0.06920	0.870	0.870	0.000	0.0	0.0
35	1.9031	1.7058	0.04053	0.04056	0.887	0.887	0.000	0.0	0.0
36	2.1469	2.0958	0.02168	0.02169	0.898	0.898	0.000	0.0	0.0
37	2.4961	2.6577	0.01050	0.01051	0.904	0.904	0.000	0.0	0.0
38	2.9946	3.4521	0.00463	0.00463	0.907	0.907	0.000	0.0	0.0
39	3.6627	4.5532	0.00176	0.00161	0.909	0.909	-0.000	0.0	0.0



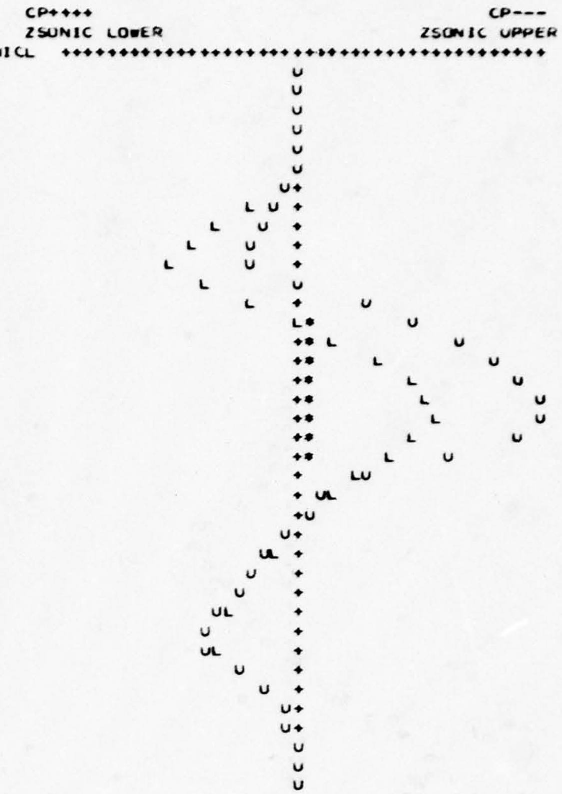
K=11 SPAN STATION ETA= 0.74074 Y= 1.66667

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-1.1881	-3.7740	0.00472	0.00472	0.907	0.907	0.000	0.0	0.0
3	-0.5281	-2.6150	0.00823	0.00823	0.905	0.905	0.000	0.0	0.0
4	-0.0517	-1.7784	0.00916	0.00917	0.905	0.905	0.000	0.0	0.0
5	0.2851	-1.1870	0.00581	0.00584	0.907	0.907	0.000	0.0	0.0
6	0.5176	-0.7787	0.00159	0.00182	0.909	0.909	0.000	0.0	0.0
7	0.6774	-0.4980	0.00481	0.00639	0.907	0.906	0.002	0.0	0.0
8	0.7924	-0.2961	0.02410	0.03377	0.896	0.891	0.010	0.0	0.0
9	0.8841	-0.1350	0.06057	0.10056	0.875	0.852	0.040	0.0	0.0
10	0.9244	-0.0643	0.09433	0.18189	0.856	0.802	0.088	0.0	0.0
11	0.9431	-0.0315	0.11235	0.24220	0.845	0.763	0.130	0.0	0.0
12	0.9554	-0.0098	0.12300	0.28806	0.838	0.731	0.165	0.0	0.0
13	0.9666	0.0098	0.02429	0.22448	0.896	0.774	0.200	0.0	0.0
14	0.9781	0.0300	-0.14428	0.08657	0.987	0.860	0.231	0.0	0.0
15	0.9914	0.0533	-0.25961	-0.01261	1.045	0.917	0.247	0.332	0.0
16	1.0090	0.0843	-0.35560	-0.10539	1.091	0.967	0.250	0.332	0.0
17	1.0346	0.1293	-0.44107	-0.19571	1.130	1.014	0.245	0.332	0.0
18	1.0709	0.1930	-0.50970	-0.26596	1.160	1.048	0.244	0.656	0.0
19	1.1127	0.2663	-0.55790	-0.30425	1.181	1.067	0.254	0.656	0.0
20	1.1524	0.3361	-0.57108	-0.30293	1.187	1.066	0.268	0.656	0.0
21	1.1906	0.4032	-0.52033	-0.26209	1.165	1.046	0.258	0.332	0.0
22	1.2292	0.4710	-0.37858	-0.20241	1.101	1.017	0.176	0.332	0.0
23	1.2690	0.5408	-0.18293	-0.14229	1.007	0.986	0.041	0.0	0.0
24	1.3100	0.6130	-0.06575	-0.08736	0.946	0.958	-0.022	0.0	0.0
25	1.3518	0.6862	-0.02585	-0.03453	0.924	0.929	-0.009	0.0	0.0
26	1.3927	0.7580	0.01741	0.01414	0.900	0.902	-0.003	0.0	0.0
27	1.4297	0.8231	0.05864	0.05671	0.877	0.878	-0.002	0.0	0.0
28	1.4602	0.8767	0.09578	0.09411	0.855	0.856	-0.002	0.0	0.0
29	1.4851	0.9204	0.13060	0.12891	0.834	0.835	-0.002	0.0	0.0
30	1.5078	0.9602	0.16696	0.16488	0.811	0.813	-0.002	0.0	0.0
31	1.5304	1.0000	0.21669	0.21265	0.780	0.782	-0.004	0.0	0.0
32	1.5675	1.0651	0.19785	0.19460	0.792	0.794	-0.003	0.0	0.0
33	1.6629	1.2325	0.11789	0.11750	0.842	0.842	-0.000	0.0	0.0
34	1.7774	1.4337	0.06949	0.06954	0.870	0.870	0.000	0.0	0.0
35	1.9324	1.7058	0.03969	0.03993	0.887	0.887	0.000	0.0	0.0
36	2.1544	2.0958	0.02115	0.02116	0.898	0.898	0.000	0.0	0.0
37	2.4744	2.6577	0.01046	0.01047	0.904	0.904	0.000	0.0	0.0
38	2.9268	3.4521	0.00486	0.00486	0.907	0.907	0.000	0.0	0.0
39	3.5538	4.5532	0.00201	0.00182	0.909	0.909	-0.000	0.0	0.0



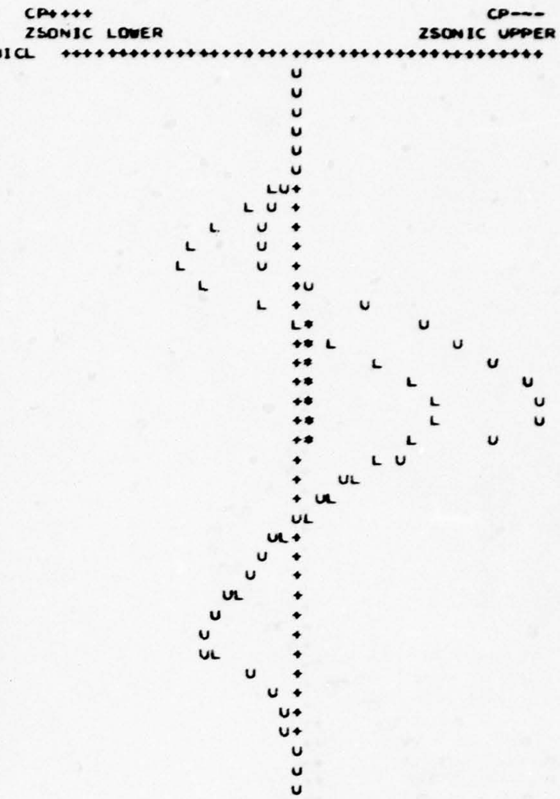
K=12 SPAN STATION ETA= 0.81481 Y= 1.83333

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.8544	-3.7740	0.00516	0.00516	0.907	0.907	0.000	0.0	0.0
3	-0.2588	-2.6150	0.00697	0.00697	0.906	0.906	0.000	0.0	0.0
4	0.1711	-1.7784	0.00504	0.00506	0.907	0.907	0.000	0.0	0.0
5	0.4750	-1.1870	-0.00022	-0.00017	0.910	0.910	0.000	0.0	0.0
6	0.6848	-0.7787	-0.00347	-0.00310	0.912	0.912	0.000	0.0	0.0
7	0.8291	-0.4980	0.00266	0.00507	0.909	0.907	0.002	0.0	0.0
8	0.9328	-0.2961	0.02339	0.03647	0.897	0.889	0.013	0.0	0.0
9	1.0156	-0.1350	0.05622	0.10455	0.878	0.850	0.048	0.0	0.0
10	1.0520	-0.0643	0.08333	0.18301	0.862	0.801	0.100	0.0	0.0
11	1.0688	-0.0315	0.09609	0.23889	0.855	0.765	0.143	0.0	0.0
12	1.0800	-0.0098	0.10278	0.28052	0.851	0.737	0.178	0.0	0.0
13	1.0900	0.0098	0.00814	0.22130	0.905	0.776	0.213	0.0	0.0
14	1.1004	0.0300	-0.15120	0.09344	0.991	0.856	0.245	0.0	0.0
15	1.1124	0.0533	-0.26095	0.00034	1.046	0.910	0.261	0.332	0.0
16	1.1283	0.0843	-0.35381	-0.08862	1.090	0.958	0.265	0.332	0.0
17	1.1514	0.1293	-0.43853	-0.17825	1.129	1.005	0.260	0.332	0.0
18	1.1842	0.1930	-0.50747	-0.25266	1.159	1.042	0.255	0.332	0.0
19	1.2219	0.2663	-0.55426	-0.29678	1.180	1.063	0.257	0.332	0.0
20	1.2577	0.3361	-0.56089	-0.30016	1.183	1.065	0.261	0.332	0.0
21	1.2922	0.4032	-0.49346	-0.26232	1.153	1.046	0.231	0.332	0.0
22	1.3270	0.4710	-0.33008	-0.20152	1.079	1.016	0.129	0.332	0.0
23	1.3629	0.5408	-0.14886	-0.13867	0.990	0.984	0.010	0.0	0.0
24	1.4000	0.6130	-0.05676	-0.08219	0.941	0.955	-0.025	0.0	0.0
25	1.4377	0.6862	-0.01689	-0.02872	0.919	0.926	-0.012	0.0	0.0
26	1.4745	0.7580	0.02687	0.02000	0.895	0.899	-0.007	0.0	0.0
27	1.5080	0.8231	0.06749	0.06229	0.871	0.874	-0.005	0.0	0.0
28	1.5355	0.8767	0.10351	0.09903	0.850	0.853	-0.004	0.0	0.0
29	1.5580	0.9204	0.13682	0.13270	0.830	0.833	-0.004	0.0	0.0
30	1.5784	0.9602	0.17112	0.16692	0.809	0.811	-0.004	0.0	0.0
31	1.5989	1.0000	0.21732	0.21148	0.779	0.783	-0.006	0.0	0.0
32	1.6324	1.0651	0.19798	0.19367	0.792	0.794	-0.004	0.0	0.0
33	1.7184	1.2325	0.11866	0.11802	0.841	0.841	-0.001	0.0	0.0
34	1.8218	1.4337	0.06826	0.06831	0.871	0.871	0.000	0.0	0.0
35	1.9616	1.7058	0.03809	0.03814	0.888	0.888	0.000	0.0	0.0
36	2.1620	2.0958	0.02014	0.02015	0.899	0.899	0.000	0.0	0.0
37	2.4508	2.6577	0.01028	0.01029	0.904	0.904	0.000	0.0	0.0
38	2.8590	3.4521	0.00506	0.00506	0.907	0.907	0.000	0.0	0.0
39	3.4248	4.5532	0.00228	0.00206	0.909	0.909	-0.000	0.0	0.0



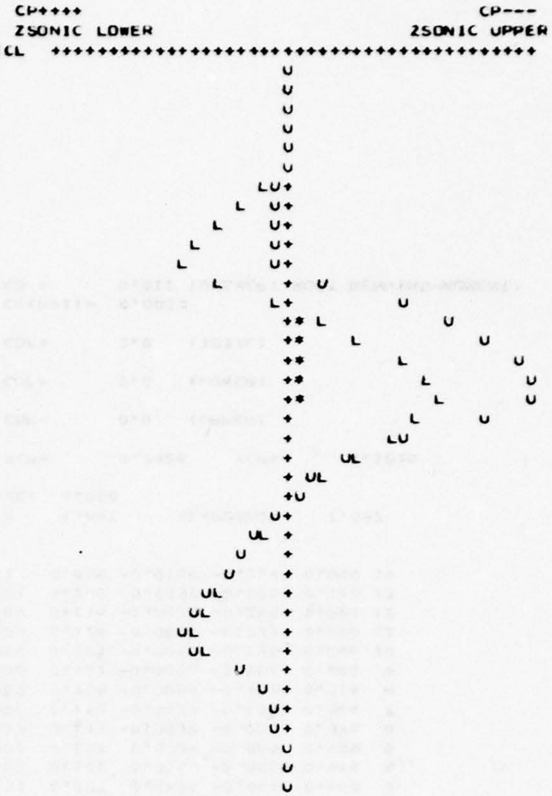
K=13 SPAN STATION ETA= 0.88889 Y= 2.00000

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.5208	-3.7740	0.00513	0.00513	0.907	0.907	0.000	0.0	0.0
3	0.0104	-2.6150	0.00483	0.00484	0.907	0.907	0.000	0.0	0.0
4	0.3939	-1.7784	0.00066	0.00068	0.910	0.910	0.000	0.0	0.0
5	0.6649	-1.1870	-0.00492	-0.00482	0.913	0.913	0.000	0.0	0.0
6	0.8521	-0.7787	-0.00607	-0.00545	0.913	0.913	0.001	0.0	0.0
7	0.9808	-0.4980	0.00236	0.00603	0.909	0.907	0.004	0.0	0.0
8	1.0733	-0.2961	0.02213	0.03952	0.898	0.888	0.017	0.0	0.0
9	1.1471	-0.1350	0.04869	0.10576	0.882	0.849	0.057	0.0	0.0
10	1.1795	-0.0643	0.06788	0.17842	0.871	0.804	0.111	0.0	0.0
11	1.1946	-0.0315	0.07511	0.22802	0.867	0.772	0.153	0.0	0.0
12	1.2045	-0.0098	0.07783	0.26413	0.865	0.748	0.186	0.0	0.0
13	1.2135	0.0098	-0.01306	0.20787	0.917	0.785	0.221	0.0	0.0
14	1.2227	0.0300	-0.16439	0.08833	0.998	0.859	0.253	0.0	0.0
15	1.2334	0.0533	-0.26978	-0.00083	1.050	0.910	0.269	0.332	0.0
16	1.2476	0.0843	-0.36066	-0.08861	1.093	0.958	0.272	0.332	0.0
17	1.2683	0.1293	-0.44553	-0.17998	1.132	1.006	0.266	0.332	0.0
18	1.2975	0.1930	-0.51316	-0.25699	1.162	1.044	0.256	0.332	0.0
19	1.3311	0.2663	-0.55217	-0.30101	1.179	1.065	0.251	0.332	0.0
20	1.3631	0.3361	-0.53692	-0.30027	1.172	1.065	0.237	0.332	0.0
21	1.3938	0.4032	-0.42782	-0.25459	1.124	1.043	0.173	0.332	0.0
22	1.4249	0.4710	-0.23605	-0.18701	1.034	1.009	0.049	0.144	0.0
23	1.4569	0.5408	-0.09350	-0.12259	0.961	0.976	-0.029	0.0	0.0
24	1.4899	0.6130	-0.04128	-0.06694	0.933	0.947	-0.026	0.0	0.0
25	1.5235	0.6862	-0.00067	-0.01479	0.910	0.918	-0.014	0.0	0.0
26	1.5564	0.7580	0.04163	0.03195	0.886	0.892	-0.010	0.0	0.0
27	1.5863	0.8231	0.08001	0.07202	0.864	0.869	-0.008	0.0	0.0
28	1.6108	0.8767	0.11367	0.10633	0.844	0.848	-0.007	0.0	0.0
29	1.6309	0.9204	0.14450	0.13729	0.825	0.830	-0.007	0.0	0.0
30	1.6491	0.9602	0.17599	0.16829	0.806	0.810	-0.008	0.0	0.0
31	1.6673	1.0000	0.21802	0.20792	0.779	0.785	-0.010	0.0	0.0
32	1.6972	1.0651	0.19605	0.18868	0.793	0.798	-0.007	0.0	0.0
33	1.7739	1.2325	0.11506	0.11367	0.843	0.844	-0.001	0.0	0.0
34	1.8661	1.4337	0.06310	0.06308	0.874	0.874	-0.000	0.0	0.0
35	1.9908	1.7058	0.03428	0.03433	0.891	0.891	0.000	0.0	0.0
36	2.1696	2.0958	0.01846	0.01848	0.900	0.900	0.000	0.0	0.0
37	2.4271	2.6577	0.00992	0.00993	0.904	0.904	0.000	0.0	0.0
38	2.7912	3.4521	0.00523	0.00524	0.907	0.907	0,000	0.0	0.0
39	3.2959	4.5532	0.00255	0.00238	0.909	0.909	-0.000	0.0	0.0



K=14 SPAN STATION ETA= 0.96296 Y= 2.16667

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.1871	-3.7740	0.00449	0.00449	0.907	0.907	0.000	0.0	0.0
3	0.2797	-2.6150	0.00203	0.00203	0.909	0.909	0.000	0.0	0.0
4	0.6167	-1.7784	-0.00348	-0.00344	0.912	0.912	0.000	0.0	0.0
5	0.8549	-1.1870	-0.00835	-0.00813	0.915	0.915	0.000	0.0	0.0
6	1.0193	-0.7787	-0.00802	-0.00682	0.914	0.914	0.001	0.0	0.0
7	1.1324	-0.4980	-0.00065	0.00534	0.910	0.907	0.006	0.0	0.0
8	1.2137	-0.2961	0.01174	0.03481	0.903	0.890	0.023	0.0	0.0
9	1.2786	-0.1350	0.02384	0.08924	0.897	0.859	0.065	0.0	0.0
10	1.3071	-0.0643	0.02819	0.14557	0.894	0.825	0.117	0.0	0.0
11	1.3203	-0.0315	0.02535	0.18086	0.896	0.803	0.156	0.0	0.0
12	1.3291	-0.0098	0.02083	0.20532	0.898	0.787	0.184	0.0	0.0
13	1.3369	0.0098	-0.07185	0.14511	0.949	0.825	0.217	0.0	0.0
14	1.3451	0.0300	-0.21570	0.02787	1.024	0.894	0.244	0.144	0.0
15	1.3545	0.0533	-0.31110	-0.05931	1.070	0.943	0.252	0.332	0.0
16	1.3669	0.0843	-0.38975	-0.14219	1.107	0.986	0.248	0.332	0.0
17	1.3851	0.1293	-0.45195	-0.21925	1.135	1.025	0.233	0.332	0.0
18	1.4107	0.1930	-0.48304	-0.27200	1.149	1.051	0.211	0.332	0.0
19	1.4403	0.2663	-0.46862	-0.28722	1.142	1.058	0.181	0.332	0.0
20	1.4684	0.3362	-0.38391	-0.25831	1.104	1.044	0.126	0.144	0.0
21	1.4954	0.4032	-0.23017	-0.19570	1.031	1.014	0.034	0.144	0.0
22	1.5227	0.4710	-0.10542	-0.13180	0.967	0.981	-0.026	0.0	0.0
23	1.5508	0.5408	-0.05146	-0.07842	0.938	0.953	-0.027	0.0	0.0
24	1.5799	0.6130	-0.01394	-0.03021	0.918	0.927	-0.016	0.0	0.0
25	1.6094	0.6862	0.02438	0.01341	0.896	0.902	-0.011	0.0	0.0
26	1.6383	0.7580	0.06097	0.05142	0.875	0.881	-0.010	0.0	0.0
27	1.6645	0.8231	0.09326	0.08327	0.856	0.862	-0.010	0.0	0.0
28	1.6861	0.8767	0.12145	0.11001	0.839	0.846	-0.011	0.0	0.0
29	1.7037	0.9204	0.14736	0.13371	0.824	0.832	-0.014	0.0	0.0
30	1.7197	0.9602	0.17388	0.15701	0.807	0.818	-0.017	0.0	0.0
31	1.7358	1.0000	0.20894	0.18597	0.785	0.799	-0.023	0.0	0.0
32	1.7620	1.0651	0.17913	0.16270	0.804	0.814	-0.016	0.0	0.0
33	1.8294	1.2325	0.09628	0.09323	0.854	0.856	-0.003	0.0	0.0
34	1.9105	1.4337	0.04982	0.04964	0.882	0.882	-0.000	0.0	0.0
35	2.0201	1.7058	0.02775	0.02776	0.894	0.894	0.000	0.0	0.0
36	2.1771	2.0958	0.01608	0.01609	0.901	0.901	0.000	0.0	0.0
37	2.4035	2.6577	0.00935	0.00935	0.905	0.905	0.000	0.0	0.0
38	2.7234	3.4521	0.00532	0.00535	0.907	0.907	0.000	0.0	0.0
39	3.1669	4.5532	0.00275	0.00287	0.908	0.908	0.000	0.0	0.0



GRUMMAN AMES TRANSONIC VISCOUS WING BODY ANALYSIS PROGRAM

WILLIAM F. BALLHAUS (USAAMRDL)
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PROGRAM DEVELOPED FOR THE AIR FORCE FLIGHT DYNAMICS LAB, WPAFB, DAYTON OHIO

RAE WING BODY CONFIGURATION

REFERENCE CHORD IS CBAR= 0.750
MOMENT ORIGIN IS XWING = 0.0

MACH = 0.910 ALPHAW = 1.00 ALPHAB = 1.00

SPANWISE FORCE DISTRIBUTIONS

K	Y	ETA	C/CAVE	C*CN/CAVE	C*CA/CAVE	C*CL/CAVE	C*CD/CAVE	C*CM/CAVE	CN	CA	CL	CD	CM	XCP/C	K
1	0.0	0.0	1.500	0.136	0.048	0.135	0.0504	-0.066	0.091	0.032	0.090	0.0336	-0.029	0.573	1
2	0.167	0.074	1.426	0.133	0.026	0.133	0.0288	-0.072	0.093	0.019	0.093	0.0202	-0.035	0.525	2
3	0.333	0.148	1.352	0.132	0.015	0.132	0.0170	-0.080	0.098	0.011	0.097	0.0126	-0.044	0.483	3
4	0.500	0.222	1.278	0.130	0.007	0.130	0.0088	-0.090	0.102	0.005	0.102	0.0069	-0.055	0.444	4
5	0.667	0.296	1.204	0.128	0.001	0.128	0.0029	-0.100	0.107	0.001	0.107	0.0024	-0.069	0.409	5
6	0.833	0.370	1.130	0.125	-0.004	0.125	-0.0013	-0.110	0.111	-0.003	0.111	-0.0012	-0.086	0.376	6
7	1.000	0.444	1.056	0.121	-0.006	0.121	-0.0040	-0.119	0.115	-0.006	0.115	-0.0037	-0.107	0.344	7
8	1.167	0.519	0.981	0.116	-0.007	0.116	-0.0053	-0.127	0.118	-0.007	0.118	-0.0054	-0.132	0.314	8
9	1.333	0.593	0.907	0.109	-0.008	0.109	-0.0056	-0.133	0.120	-0.008	0.121	-0.0062	-0.161	0.288	9
10	1.500	0.667	0.833	0.101	-0.007	0.101	-0.0054	-0.135	0.121	-0.009	0.121	-0.0065	-0.195	0.266	10
11	1.667	0.741	0.759	0.091	-0.007	0.091	-0.0051	-0.133	0.119	-0.009	0.120	-0.0067	-0.231	0.246	11
12	1.833	0.815	0.685	0.078	-0.006	0.078	-0.0050	-0.124	0.114	-0.009	0.114	-0.0073	-0.265	0.221	12
13	2.000	0.889	0.611	0.061	-0.007	0.061	-0.0059	-0.105	0.099	-0.011	0.100	-0.0097	-0.280	0.180	13
14	2.167	0.963	0.537	0.035	-0.009	0.035	-0.0083	-0.065	0.066	-0.017	0.066	-0.0154	-0.224	0.090	14

TOTAL FORCE COEFFICIENTS
(BASED ON SREF)

SREF= 1.688 STRUE= 1.687 SEXPOSED= 1.687
AR REF= 6.000 AR TRUE= 6.000

CN = 0.10475 XCP= 0.7426 YCP= 1.1215

CA = 0.00107 CDF= 0.0 (UPPER)

CM = -0.10369 CDF= 0.0 (LOWER)

CL = 0.10473 (SURFACE PRESSURE INTEGRATION) CDF= 0.0 (TOTAL)
0.11766 (CIRCULATION)

CD(P+I)= 0.0029

CD = 0.00290 CB = 0.011 (UNSWEPT ROOT BENDING-MOMENT)

COMPUTATIONAL GRID

N	XI	ETA	ZT	DX	DY	DZ	D2X	D2Y	D2Z
1	-0.44863	0.0	-2.06629	0.0	0.0	0.0	0.0	0.0	0.0
2	-0.20135	0.08182	-1.44722	0.1803	0.0818	0.5464	-0.1340	0.0	-0.1453
3	-0.08810	0.16364	-0.97350	0.0756	0.0818	0.4081	-0.0753	0.0	-0.1313
4	-0.05016	0.24545	-0.63107	0.0279	0.0818	0.2697	-0.0201	0.0	-0.1055
5	-0.03232	0.32727	-0.39415	0.0146	0.0818	0.1980	-0.0065	0.0	-0.0779
6	-0.02102	0.40909	-0.23511	0.0101	0.0818	0.1315	-0.0024	0.0	-0.0552
7	-0.01212	0.49091	-0.13124	0.0085	0.0818	0.0844	-0.0008	0.0	-0.0390
8	-0.00400	0.57273	-0.06641	0.0081	0.0818	0.0512	-0.0001	0.0000	-0.0272
9	0.00400	0.65455	-0.02875	0.0080	0.0818	0.0294	0.0000	0.0	-0.0166
10	0.01200	0.73636	-0.00770	0.0080	0.0818	0.0182	0.0001	0.0000	-0.0057
11	0.02008	0.81818	0.00770	0.0082	0.0818	0.0182	0.0002	0.0000	0.0057
12	0.02834	0.90000	0.02875	0.0084	0.0818	0.0294	0.0003	0.0000	0.0166
13	0.03694	0.98182	0.06641	0.0089	0.0818	0.0512	0.0006	0.0000	0.0272
14	0.04609	1.06364	0.13124	0.0096	0.0818	0.0844	0.0008	-0.0000	0.0390
15	0.05607	1.14545	0.23511	0.0106	0.0818	0.1315	0.0012	0.0000	0.0552
16	0.06720	1.22727	0.39415	0.0119	0.0818	0.1980	0.0016	0.0	0.0779
17	0.07991	1.30909	0.63107	0.0137	0.0818	0.2897	0.0021	-0.0000	0.1055
18	0.09469	1.39091	0.97350	0.0161	0.0818	0.4081	0.0026	0.0000	0.1313
19	0.11210	1.47273	1.44722	0.0189	0.0818	0.5464	0.0031	-0.0000	0.1453
20	0.13259	1.55454	2.06629	0.0221	0.0818	0.0	0.0033	0.0000	0.0
21	0.15636	1.63636	0.0	0.0253	0.0818	0.0	0.0030	-0.0000	0.0
22	0.18312	1.71818	0.0	0.0278	0.0818	0.0	0.0021	0.0000	0.0
23	0.21201	1.80000	0.0	0.0294	0.0818	0.0	0.001[illegible]	-0.0000	0.0
24	0.24192	1.88182	0.0	0.0299	0.0818	0.0	0.0001	0.0000	0.0
25	0.27189	1.96364	0.0	0.0297	0.0818	0.0	-0.0005	0.0	0.0
26	0.30140	2.04545	0.0	0.0292	0.0818	0.0	-0.0006	-0.0000	0.0
27	0.33030	2.12727	0.0	0.0286	0.0818	0.0	-0.0005	0.0000	0.0
28	0.35869	2.20909	0.0	0.0282	0.0818	0.0	-0.0003	-0.0000	0.0
29	0.38674	2.29091	0.0	0.0280	0.0818	0.0	-0.0002	0.0	0.0
30	0.41463	2.37273	0.0	0.0279	0.0	0.0	-0.0000	0.0	0.0
31	0.44251	0.0	0.0	0.0279	0.0	0.0	0.0001	0.0	0.0
32	0.47052	0.0	0.0	0.0281	0.0	0.0	0.0002	0.0	0.0
33	0.49873	0.0	0.0	0.0283	0.0	0.0	0.0003	0.0	0.0
34	0.52719	0.0	0.0	0.0286	0.0	0.0	0.0003	0.0	0.0
35	0.55594	0.0	0.0	0.0289	0.0	0.0	0.0003	0.0	0.0
36	0.58499	0.0	0.0	0.0292	0.0	0.0	0.0003	0.0	0.0
37	0.61432	0.0	0.0	0.0295	0.0	0.0	0.0003	0.0	0.0
38	0.64392	0.0	0.0	0.0297	0.0	0.0	0.0002	0.0	0.0
39	0.67373	0.0	0.0	0.0299	0.0	0.0	0.0001	0.0	0.0
40	0.70368	0.0	0.0	0.0300	0.0	0.0	0.0000	0.0	0.0
41	0.73365	0.0	0.0	0.0299	0.0	0.0	-0.0002	0.0	0.0
42	0.76342	0.0	0.0	0.0295	0.0	0.0	-0.0005	0.0	0.0
43	0.79269	0.0	0.0	0.0288	0.0	0.0	-0.0009	0.0	0.0
44	0.82106	0.0	0.0	0.0277	0.0	0.0	-0.0013	0.0	0.0
45	0.84812	0.0	0.0	0.0262	0.0	0.0	-0.0016	0.0	0.0
46	0.87354	0.0	0.0	0.0245	0.0	0.0	-0.0018	0.0	0.0
47	0.89720	0.0	0.0	0.0229	0.0	0.0	-0.0016	0.0	0.0
48	0.91928	0.0	0.0	0.0215	0.0	0.0	-0.0012	0.0	0.0
49	0.94014	0.0	0.0	0.0205	0.0	0.0	-0.0007	0.0	0.0
50	0.96028	0.0	0.0	0.0200	0.0	0.0	-0.0003	0.0	0.0
51	0.98015	0.0	0.0	0.0199	0.0	0.0	-0.0000	0.0	0.0
52	1.00000	0.0	0.0	0.0201	0.0	0.0	0.0006	0.0	0.0
53	1.02041	0.0	0.0	0.0225	0.0	0.0	0.0041	0.0	0.0
54	1.04493	0.0	0.0	0.0311	0.0	0.0	0.0131	0.0	0.0
55	1.08256	0.0	0.0	0.0540	0.0	0.0	0.0327	0.0	0.0
56	1.15290	0.0	0.0	0.0939	0.0	0.0	0.0471	0.0	0.0
57	1.27034	0.0	0.0	0.1225	0.0	0.0	0.0101	0.0	0.0
58	1.39791	0.0	0.0	0.1353	0.0	0.0	0.0154	0.0	0.0
59	1.54086	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

REFERENCE TRAPEZOIDAL WING DESCRIPTION

L.E. SWEEP DX/DY	L.E. SWEEP (DEG.)	T.E. SWEEP DX/DY	T.E. SWEEP (DEG.)	ROOT CHORD	TIP CHORD	WING AREA	ASPECT RATIO	TAPER RATIO	MEAN CHORD	AVERAGE CHORD
0.744	36.668	0.411	22.338	1.125	0.375	1.668	6.000	0.333	0.813	0.750

ACTUAL INPUT WING PLANFORM CHARATERISTICS

K	ETA	Y	XLEW	XTEW	CORDW	JLE(K)	JTE(K)	NX	(X -XLEW)/C	(X -XTEW)/C	XLEWP	XTEWP	K
NOMINAL WING ROOT													
1	0.0	0.0	-0.2790	0.8460	1.1250	9	52	44	0.0040	1.0000	0.7440	0.4107	1
2	0.0364	0.0818	-0.2181	0.8796	1.0977	9	52	44	0.0040	1.0000	0.7440	0.4107	2
3	0.0727	0.1636	-0.1573	0.9132	1.0705	9	52	44	0.0040	1.0000	0.7440	0.4107	3
4	0.1091	0.2455	-0.0964	0.9468	1.0432	9	52	44	0.0040	1.0000	0.7440	0.4107	4
5	0.1455	0.3273	-0.0355	0.9804	1.0159	9	52	44	0.0040	1.0000	0.7440	0.4107	5
6	0.1818	0.4091	0.0254	1.0140	0.9886	9	52	44	0.0040	1.0000	0.7440	0.4107	6
7	0.2182	0.4909	0.0862	1.0476	0.9614	9	52	44	0.0040	1.0000	0.7440	0.4107	7
8	0.2545	0.5727	0.1471	1.0812	0.9341	9	52	44	0.0040	1.0000	0.7440	0.4107	8
9	0.2909	0.6545	0.2080	1.1148	0.9068	9	52	44	0.0040	1.0000	0.7440	0.4107	9
10	0.3273	0.7364	0.2689	1.1484	0.8795	9	52	44	0.0040	1.0000	0.7440	0.4107	10
11	0.3636	0.8182	0.3297	1.1820	0.8523	9	52	44	0.0040	1.0000	0.7440	0.4107	11
12	0.4000	0.9000	0.3906	1.2156	0.8250	9	52	44	0.0040	1.0000	0.7440	0.4107	12
13	0.4364	0.9818	0.4515	1.2492	0.7977	9	52	44	0.0040	1.0000	0.7440	0.4107	13
14	0.4727	1.0636	0.5123	1.2828	0.7705	9	52	44	0.0040	1.0000	0.7440	0.4107	14
15	0.5091	1.1455	0.5732	1.3164	0.7432	9	52	44	0.0040	1.0000	0.7440	0.4107	15
16	0.5455	1.2273	0.6341	1.3500	0.7159	9	52	44	0.0040	1.0000	0.7440	0.4107	16
17	0.5818	1.3091	0.6950	1.3836	0.6886	9	52	44	0.0040	1.0000	0.7440	0.4107	17
18	0.6182	1.3909	0.7558	1.4172	0.6614	9	52	44	0.0040	1.0000	0.7440	0.4107	18
19	0.6545	1.4727	0.8167	1.4508	0.6341	9	52	44	0.0040	1.0000	0.7440	0.4107	19
20	0.6909	1.5545	0.8776	1.4844	0.6068	9	52	44	0.0040	1.0000	0.7440	0.4107	20
21	0.7273	1.6364	0.9385	1.5180	0.5795	9	52	44	0.0040	1.0000	0.7440	0.4107	21
22	0.7636	1.7182	0.9993	1.5516	0.5523	9	52	44	0.0040	1.0000	0.7440	0.4107	22
23	0.8000	1.8000	1.0602	1.5852	0.5250	9	52	44	0.0040	1.0000	0.7440	0.4107	23
24	0.8364	1.8818	1.1211	1.6188	0.4977	9	52	44	0.0040	1.0000	0.7440	0.4107	24
25	0.8727	1.9636	1.1819	1.6524	0.4705	9	52	44	0.0040	1.0000	0.7440	0.4107	25
26	0.9091	2.0455	1.2428	1.6860	0.4432	9	52	44	0.0040	1.0000	0.7440	0.4107	26
27	0.9455	2.1273	1.3037	1.7196	0.4159	9	52	44	0.0040	1.0000	0.7440	0.4107	27
28	0.9818	2.2091	1.3646	1.7532	0.3886	9	52	44	0.0040	1.0000	0.7440	0.4107	28

STRUE = 1.6875
ARTRUE = 6.0000
SEXPUSED= 1.6875
C(MAC) = 0.8127
XLE(MAC)= 0.4181

DETAILS OF XI MAPPING

K	ETA	Y	XI=0.0 XLE	XI=1.0 XTE	XLEP	XTEP	UPSTREAM AND DOWNSTREAM BOUDARIES XUP	XDOWN	XIY(UP)	XIY(DN)	K
	NOMINAL WING ROOT										
1	0.0	0.0	-0.2790	0.8460	0.7440	0.4107	-0.7837	1.4545	-0.7943	-0.2048	1
2	0.0364	0.0818	-0.2181	0.8796	0.7440	0.4107	-0.7106	1.4733	-0.8140	-0.2099	2
3	0.0727	0.1636	-0.1573	0.9132	0.7440	0.4107	-0.6375	1.4922	-0.8347	-0.2152	3
4	0.1091	0.2455	-0.0964	0.9468	0.7440	0.4107	-0.5644	1.5110	-0.8566	-0.2208	4
5	0.1455	0.3273	-0.0355	0.9804	0.7440	0.4107	-0.4913	1.5299	-0.8796	-0.2268	5
6	0.1818	0.4091	0.0254	1.0140	0.7440	0.4107	-0.4182	1.5487	-0.9038	-0.2330	6
7	0.2182	0.4909	0.0862	1.0476	0.7440	0.4107	-0.3451	1.5676	-0.9295	-0.2396	7
8	0.2545	0.5727	0.1471	1.0812	0.7440	0.4107	-0.2720	1.5864	-0.9566	-0.2466	8
9	0.2909	0.6545	0.2080	1.1148	0.7440	0.4107	-0.1988	1.6053	-0.9854	-0.2541	9
10	0.3273	0.7364	0.2689	1.1484	0.7440	0.4107	-0.1257	1.6241	-1.0159	-0.2619	10
11	0.3636	0.8182	0.3297	1.1820	0.7440	0.4107	-0.0526	1.6430	-1.0484	-0.2703	11
12	0.4000	0.9000	0.3906	1.2156	0.7440	0.4107	0.0205	1.6618	-1.0831	-0.2793	12
13	0.4364	0.9818	0.4515	1.2492	0.7440	0.4107	0.0936	1.6807	-1.1201	-0.2888	13
14	0.4727	1.0636	0.5123	1.2828	0.7440	0.4107	0.1667	1.6995	-1.1598	-0.2990	14
15	0.5091	1.1455	0.5732	1.3164	0.7440	0.4107	0.2398	1.7184	-1.2023	-0.3100	15
16	0.5455	1.2273	0.6341	1.3500	0.7440	0.4107	0.3129	1.7372	-1.2481	-0.3218	16
17	0.5818	1.3091	0.6950	1.3836	0.7440	0.4107	0.3860	1.7561	-1.2976	-0.3345	17
18	0.6182	1.3909	0.7558	1.4172	0.7440	0.4107	0.4591	1.7749	-1.3511	-0.3483	18
19	0.6545	1.4727	0.8167	1.4508	0.7440	0.4107	0.5322	1.7938	-1.4092	-0.3633	19
20	0.6909	1.5545	0.8776	1.4844	0.7440	0.4107	0.6053	1.8126	-1.4725	-0.3797	20
21	0.7273	1.6364	0.9385	1.5180	0.7440	0.4107	0.6785	1.8314	-1.5418	-0.3975	21
22	0.7636	1.7182	0.9993	1.5516	0.7440	0.4107	0.7516	1.8503	-1.6179	-0.4172	22
23	0.8000	1.8000	1.0602	1.5852	0.7440	0.4107	0.8247	1.8691	-1.7020	-0.4388	23
24	0.8364	1.8818	1.1211	1.6188	0.7440	0.4107	0.8978	1.8880	-1.7952	-0.4629	24
25	0.8727	1.9636	1.1819	1.6524	0.7440	0.4107	0.9709	1.9068	-1.8993	-0.4897	25
26	0.9091	2.0455	1.2428	1.6860	0.7440	0.4107	1.0440	1.9257	-2.0162	-0.5198	26
27	0.9455	2.1273	1.3037	1.7196	0.7440	0.4107	1.1171	1.9445	-2.1484	-0.5539	27
28	0.9818	2.2091	1.3646	1.7532	0.7440	0.4107	1.1902	1.9634	-2.2992	-0.5928	28
	NOMINAL WING TIP										
29	1.0182	2.2909	1.4254	1.7868	0.7440	0.4107	1.2633	1.9822	-2.4727	-0.6375	29
30	1.0545	2.3727	1.4863	1.8204	0.7440	0.4107	1.3364	2.0011	-2.6746	-0.6896	30

COMPUTATIONAL GRID CRUDE EXTERIOR GRID

N	XIEX	ETAX	ZTX
1	-11.26913	0.0	-11.25000
2	-8.27966	0.21429	-8.51163
3	-6.09627	0.42857	-6.29131
4	-4.48864	0.64286	-4.52810
5	-3.29227	0.85714	-3.16105
6	-2.38967	1.07143	-2.12921
7	-1.69689	1.28571	-1.37163
8	-1.15400	1.50000	-0.82737
9	-0.71816	1.71428	-0.43547
10	-0.35880	1.92857	-0.13500
11	-0.05405	2.14286	0.13500
12	0.21168	2.35714	0.43547
13	0.44954	2.72143	0.82737
14	0.66246	3.34071	1.37163
15	0.85304	4.39349	2.12921
16	1.02364	6.18323	3.16105
17	1.17635	9.22577	4.52810
18	1.31304	14.39810	6.29131
19	1.43539	0.0	8.51163
20	1.54492	0.0	11.25000
21	1.65444	0.0	0.0
22	1.76397	0.0	0.0
23	1.88632	0.0	0.0
24	2.03434	0.0	0.0
25	2.23368	0.0	0.0
26	2.53568	0.0	0.0
27	3.04296	0.0	0.0
28	3.96084	0.0	0.0
29	5.69990	0.0	0.0
30	9.08133	0.0	0.0

J INDEX OF LEADING AND TRAILING EDGE POINTS AND X LOCATIONS

K	ETAX	JLEX	JTEX	XLEWX	XTEWX
1	0.0	12	15	-0.279000	0.846000
2	0.214286	12	16	-0.119571	0.934000
3	0.428571	13	16	0.039857	1.021999
4	0.642857	13	17	0.199286	1.110000
5	0.857143	14	17	0.358714	1.198000
6	1.071428	15	18	0.518143	1.285999
7	1.285714	15	19	0.677571	1.374000
8	1.499999	16	20	0.836999	1.461999
9	1.714285	17	20	0.996428	1.549999
10	1.928571	18	21	1.155856	1.638000
11	2.142857	19	22	1.315285	1.726000

WING SURFACE GEOMETRY

K= 1 Y= 0.0 ETA = 0.0 CHORD = 1.1250 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871694	-0.871669	41.07848	-41.07764
2	0.011998	0.012073	-0.012073	0.493276	-0.493283	26.25603	-26.25632
3	0.020076	0.015522	-0.015522	0.375060	-0.375054	20.55907	-20.55875
4	0.028337	0.018326	-0.018326	0.309345	-0.309342	17.18921	-17.18903
5	0.036940	0.020784	-0.020785	0.265198	-0.265197	14.85283	-14.85279
6	0.046093	0.023052	-0.023052	0.231759	-0.231756	13.04843	-13.04841
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56116	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26728
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08422
10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068656	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00483
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26021	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26802	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68097	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038477	-0.038477	-0.058418	0.058418	-3.34330	3.34330
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584991	0.032856	-0.032856	-0.070944	0.070944	-4.05798	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643916	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080493	0.080494	-4.60201	4.60201
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 2 Y= 0.0818 ETA = 0.0364 CHORD = 1.0977 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493277	-0.493283	26.25604	-26.25632
3	0.020076	0.015522	-0.015522	0.375060	-0.375054	20.55908	-20.55875
4	0.028337	0.018326	-0.018326	0.309345	-0.309342	17.18921	-17.18904
5	0.036940	0.020784	-0.020785	0.265198	-0.265198	14.85283	-14.85280
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04842
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423

10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068656	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00483
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26802	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042656	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85708	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05798	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703661	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 3 Y= 0.1636 ETA = 0.0727 CHORD = 1.0705 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871670	41.07849	-41.07767
2	0.011998	0.012073	-0.012073	0.493277	-0.493283	26.25604	-26.25633
3	0.020076	0.015522	-0.015522	0.375061	-0.375054	20.55908	-20.55876
4	0.028337	0.018326	-0.018326	0.309346	-0.309342	17.18922	-17.18904
5	0.036940	0.020784	-0.020785	0.265198	-0.265198	14.85284	-14.85281
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26729	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.98109	-7.98104
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60450	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26803	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042656	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052922	-3.02935	3.02935
25	0.498727	0.038478	-0.038478	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409

27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22974
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080325	0.080324	-4.59240	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60231	4.60231
38	0.873538	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59989	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940143	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K= 4   Y=   0.2455   ETA = 0.1091   CHORD =   1.0432   TWIST ANGLE =   0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493276	-0.493283	26.25603	-26.25632
3	0.020076	0.015522	-0.015522	0.375060	-0.375054	20.55908	-20.55875
4	0.028337	0.018326	-0.018326	0.309346	-0.309342	17.18921	-17.18904
5	0.036940	0.020784	-0.020785	0.265198	-0.265198	14.85283	-14.85280
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04842
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26728
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.96108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068656	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26802	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05798	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940143	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60111	4.60111
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128

44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 5 Y= 0.3273 ETA = 0.1455 CHORD = 1.0159 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871670	41.07849	-41.07767
2	0.011998	0.012073	-0.012073	0.493277	-0.493283	26.25606	-26.25633
3	0.020076	0.015522	-0.015522	0.375061	-0.375054	20.55908	-20.55876
4	0.028337	0.018326	-0.018326	0.309346	-0.309342	17.18922	-17.18904
5	0.036940	0.020784	-0.020785	0.265198	-0.265198	14.85284	-14.85281
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26729	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08431	-9.08423
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.98109	-7.98104
11	0.112099	0.034009	-0.034009	0.121324	-0.121324	6.91754	-6.91752
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89022
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052493	-0.052492	3.00487	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037136	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60450	0.60450
20	0.358693	0.044405	-0.044405	-0.022134	0.022135	-1.26801	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27008	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052922	-3.02935	3.02935
25	0.498727	0.038478	-0.038478	-0.058418	0.058418	-3.34331	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22974
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60231	4.60231
38	0.873538	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59989	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940143	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960285	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K= 6 Y= 0.4091 ETA = 0.1818 CHORD = 0.9886 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871694	-0.871669	41.07848	-41.07764
2	0.011998	0.012073	-0.012073	0.493276	-0.493283	26.25603	-26.25632
3	0.020076	0.015522	-0.015522	0.375060	-0.375054	20.55907	-20.55875
4	0.028337	0.018326	-0.018326	0.309345	-0.309342	17.18921	-17.18903
5	0.036940	0.020784	-0.020785	0.265198	-0.265197	14.85283	-14.85279
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04843	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56116	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751

12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068656	3.92756	-3.92756
15	0.212011	0.042343	-0.042343	0.052493	-0.052492	3.00487	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26021	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022134	0.022135	-1.26800	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80502
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27008	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68097	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038477	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85708	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05798	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080493	0.080494	-4.60201	4.60201
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080507	-4.60281	4.60281
41	0.940143	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960285	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 7 Y= 0.4909 ETA = 0.2182 CHORD = 0.9614 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493276	-0.493283	26.25603	-26.25632
3	0.020076	0.015522	-0.015522	0.375060	-0.375054	20.55907	-20.55875
4	0.028337	0.018326	-0.018326	0.309345	-0.309342	17.18921	-17.18906
5	0.036939	0.020784	-0.020784	0.265198	-0.265198	14.85283	-14.85281
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26728
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00483
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26021	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26802	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68097	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05798	4.05799

29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080493	0.080494	-4.60201	4.60201
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940143	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60111
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 8 Y= 0.5727 ETA = 0.2545 CHORD = 0.9341 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493277	-0.493283	26.25604	-26.25633
3	0.020076	0.015522	-0.015522	0.375060	-0.375055	20.55908	-20.55878
4	0.028337	0.018326	-0.018326	0.309345	-0.309343	17.18921	-17.18906
5	0.036939	0.020784	-0.020785	0.265198	-0.265198	14.85283	-14.85282
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26728
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.98108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068656	3.92757	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00483
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26803	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042656	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080493	0.080494	-4.60201	4.60201
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K= 9 Y= 0.6545 ETA = 0.2909 CHORD = 0.9068 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07849	-41.07767
2	0.011998	0.012073	-0.012073	0.493277	-0.493283	26.25604	-26.25633
3	0.020075	0.015522	-0.015522	0.375061	-0.375055	20.55908	-20.55878
4	0.028337	0.018326	-0.018326	0.309346	-0.309342	17.18921	-17.18904
5	0.036939	0.020784	-0.020785	0.265198	-0.265198	14.85283	-14.85282
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04842
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56111
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26728
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.98108	-7.98104
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60450	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26803	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038478	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60201
39	0.897202	0.008274	-0.008274	-0.080456	0.080456	-4.59989	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960285	0.003196	-0.003196	-0.080478	0.080478	-4.60111	4.60111
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K=10 Y= 0.7364 ETA = 0.3273 CHORD = 0.8795 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871670	41.07849	-41.07767
2	0.011998	0.012073	-0.012073	0.493277	-0.493283	26.25604	-26.25633
3	0.020075	0.015522	-0.015522	0.375061	-0.375055	20.55908	-20.55879
4	0.028337	0.018326	-0.018326	0.309346	-0.309343	17.18921	-17.18906
5	0.036940	0.020784	-0.020785	0.265198	-0.265198	14.85284	-14.85282
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26729	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.98108	-7.98104
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826

14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60450	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26803	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042656	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052922	-3.02935	3.02935
25	0.498727	0.038478	-0.038478	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22974
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848120	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897202	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=11 Y= 0.8182 ETA = 0.3636 CHORD = 0.8523 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871670	41.07849	-41.07767
2	0.011998	0.012073	-0.012073	0.493277	-0.493283	26.25606	-26.25633
3	0.020075	0.015522	-0.015522	0.375061	-0.375055	20.55908	-20.55879
4	0.028337	0.018326	-0.018326	0.309346	-0.309343	17.18922	-17.18907
5	0.036940	0.020784	-0.020785	0.265198	-0.265198	14.85284	-14.85281
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04845	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56111
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26729	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08431	-9.08424
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.98109	-7.98104
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92757
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60450	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26803	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052922	-3.02935	3.02935
25	0.498727	0.038478	-0.038478	-0.058418	0.058418	-3.34331	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22974
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773

31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080325	0.080324	-4.59240	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848120	0.012225	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K=12 Y= 0.9000 ETA = 0.4000 CHORD = 0.8250 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871694	-0.871669	41.07848	-41.07764
2	0.011998	0.012073	-0.012073	0.493291	-0.493284	26.25673	-26.25636
3	0.020075	0.015522	-0.015522	0.375060	-0.375054	20.55907	-20.55878
4	0.028337	0.018326	-0.018326	0.309345	-0.309343	17.18921	-17.18907
5	0.036939	0.020784	-0.020784	0.265198	-0.265198	14.85283	-14.85281
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56116	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98106	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91750
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068656	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052493	-0.052492	3.00486	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26021	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26802	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80502
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68097	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038477	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05798	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703681	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792686	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873537	0.010178	-0.010178	-0.080493	0.080493	-4.60201	4.60201
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080507	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60259	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60111	4.60111
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=13 Y= 0.9818 ETA = 0.4364 CHORD = 0.7977 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493291	-0.493284	26.25673	-26.25636
3	0.020075	0.015522	-0.015522	0.375060	-0.375055	20.55907	-20.55878
4	0.028337	0.018326	-0.018326	0.309345	-0.309342	17.18921	-17.18903
5	0.036939	0.020784	-0.020784	0.265198	-0.265198	14.85283	-14.85281
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04842
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26728
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132569	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88826	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00483
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26021	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26802	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68097	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703680	0.023833	-0.023833	-0.079562	0.079562	-4.54900	4.54900
33	0.733645	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821062	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848120	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080493	0.080494	-4.60201	4.60201
39	0.897202	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960285	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

KSWICH= 0

K=14 Y= 0.0636 ETA = 0.4727 CHORD = 0.7705 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493291	-0.493284	26.25673	-26.25636
3	0.020075	0.015522	-0.015522	0.375060	-0.375054	20.55907	-20.55878
4	0.028337	0.018326	-0.018326	0.309345	-0.309343	17.18921	-17.18906
5	0.036939	0.020784	-0.020784	0.265198	-0.265198	14.85283	-14.85282
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56111
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.98108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132569	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021

13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00483
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022134	0.022135	-1.26800	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68097	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22973
30	0.643917	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703680	0.023833	-0.023833	-0.079562	0.079562	-4.54900	4.54901
33	0.733645	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763415	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792686	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848120	0.012225	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=15 Y= 1.1455 ETA = 0.5091 CHORD = 0.7432 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493291	-0.493284	26.25673	-26.25636
3	0.020076	0.015522	-0.015522	0.375060	-0.375054	20.55908	-20.55875
4	0.028337	0.018326	-0.018326	0.309346	-0.309342	17.18921	-17.18906
5	0.036939	0.020784	-0.020784	0.265198	-0.265198	14.85283	-14.85282
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04843	-13.04843
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26726	-10.26728
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98108	-7.98103
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00483
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26802	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68097	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527192	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973

30	0.643917	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673728	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703680	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733645	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792686	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873538	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=16 Y= 1.2273 ETA = 0.5455 CHORD = 0.7159 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871670	41.07849	-41.07767
2	0.011998	0.012073	-0.012073	0.493292	-0.493284	26.25673	-26.25638
3	0.020076	0.015522	-0.015522	0.375061	-0.375055	20.55908	-20.55878
4	0.028337	0.018326	-0.018326	0.309346	-0.309343	17.18922	-17.18907
5	0.036940	0.020784	-0.020785	0.265198	-0.265198	14.85284	-14.85281
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04844
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56111
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26729	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08431	-9.08424
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.98108	-7.98104
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132569	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60450	0.60450
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26803	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042656	-0.042655	-0.039641	0.039641	-2.27010	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038478	-0.058418	0.058418	-3.34330	3.34331
26	0.527190	0.036746	-0.036746	-0.063161	0.063161	-3.61408	3.61408
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614323	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973
30	0.643917	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703680	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733645	0.021437	-0.021437	-0.080325	0.080324	-4.59240	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792687	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848120	0.012225	-0.012224	-0.080499	0.080499	-4.60231	4.60231
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59989	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940143	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K=17 Y= 1.3091 ETA = 0.5818 CHORD = 0.6886 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871670	41.07851	-41.07768
2	0.011998	0.012073	-0.012073	0.493292	-0.493284	26.25674	-26.25638
3	0.020075	0.015522	-0.015522	0.375061	-0.375055	20.55908	-20.55879
4	0.028337	0.018326	-0.018326	0.309346	-0.309343	17.16922	-17.16907
5	0.036939	0.020784	-0.020785	0.265198	-0.265198	14.85285	-14.85263
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04845	-13.04843
7	0.056066	0.025221	-0.025221	0.204565	-0.204564	11.56118	-11.56113
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26729	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08431	-9.08424
10	0.094694	0.031739	-0.031739	0.140204	-0.140203	7.96109	-7.96104
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89027	-5.89022
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88827
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92757
15	0.212011	0.042343	-0.042343	0.052493	-0.052492	3.00487	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60450	0.60450
20	0.358693	0.044405	-0.044405	-0.022134	0.022135	-1.26801	1.26802
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80503
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27008	2.27010
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68099
24	0.470518	0.040050	-0.040050	-0.052921	0.052921	-3.02934	3.02934
25	0.498726	0.038478	-0.038478	-0.058418	0.058418	-3.34330	3.34330
26	0.527191	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032857	-0.032856	-0.070944	0.070944	-4.05799	4.05800
29	0.614323	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22974
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36774
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47193
32	0.703680	0.023834	-0.023833	-0.079562	0.079563	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080325	0.080325	-4.59240	4.59240
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60212	4.60212
35	0.792686	0.016686	-0.016686	-0.080499	0.080499	-4.60233	4.60232
36	0.821060	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60231	4.60231
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60202	4.60202
39	0.897202	0.008274	-0.008274	-0.080456	0.080456	-4.59989	4.59989
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940141	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960285	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980145	0.001598	-0.001598	-0.080481	0.080481	-4.60128	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60124	4.60124

K=16 Y= 1.3909 ETA = 0.6182 CHORD = 0.6614 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871670	41.07851	-41.07767
2	0.011998	0.012073	-0.012073	0.493292	-0.493284	26.25674	-26.25638
3	0.020075	0.015522	-0.015522	0.375061	-0.375055	20.55908	-20.55879
4	0.028337	0.018326	-0.018326	0.309346	-0.309343	17.16922	-17.16910
5	0.036939	0.020784	-0.020785	0.265198	-0.265198	14.85285	-14.85284
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04845	-13.04843
7	0.056066	0.025221	-0.025221	0.204565	-0.204563	11.56118	-11.56112
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26729	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08431	-9.08424
10	0.094694	0.031739	-0.031739	0.140204	-0.140204	7.96109	-7.96105
11	0.112099	0.034009	-0.034009	0.121324	-0.121324	6.91754	-6.91752
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89027	-5.89022
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92757

15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00484
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271868	0.044568	-0.044568	0.021998	-0.021998	1.26022	-1.26021
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60450	0.60450
20	0.358693	0.044405	-0.044405	-0.022134	0.022135	-1.26801	1.26802
21	0.386738	0.043650	-0.043650	-0.031514	0.031514	-1.80500	1.80501
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27008	2.27009
23	0.442512	0.041448	-0.041448	-0.046826	0.046826	-2.68096	2.68098
24	0.470518	0.040050	-0.040050	-0.052921	0.052921	-3.02934	3.02935
25	0.498726	0.038478	-0.038478	-0.058418	0.058418	-3.34330	3.34330
26	0.527191	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584990	0.032857	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614323	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36774
31	0.673728	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703680	0.023834	-0.023833	-0.079562	0.079563	-4.54901	4.54901
33	0.733646	0.021437	-0.021437	-0.080325	0.080325	-4.59240	4.59240
34	0.763415	0.019042	-0.019042	-0.080495	0.080495	-4.60212	4.60212
35	0.792686	0.016686	-0.016686	-0.080499	0.080499	-4.60233	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848120	0.012224	-0.012224	-0.080499	0.080499	-4.60231	4.60231
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60202	4.60202
39	0.897202	0.008274	-0.008274	-0.080456	0.080456	-4.59989	4.59989
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960283	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980145	0.001598	-0.001598	-0.080481	0.080481	-4.60128	4.60128
44	0.999999	0.000000	-0.000000	-0.080480	0.080480	-4.60124	4.60124

K=19 Y= 1.4727 ETA = 0.6545 CHORD = 0.6341 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493291	-0.493285	26.25673	-26.25641
3	0.020075	0.015522	-0.015522	0.375060	-0.375055	20.55907	-20.55879
4	0.028337	0.018326	-0.018326	0.309345	-0.309343	17.18921	-17.18906
5	0.036940	0.020784	-0.020785	0.265198	-0.265198	14.85283	-14.85280
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04842
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56116	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26728
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08423
10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98108	-7.98104
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91754	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052492	-0.052492	3.00484	-3.00483
16	0.241917	0.043682	-0.043682	0.037136	-0.037135	2.12673	-2.12673
17	0.271888	0.044568	-0.044568	0.021998	-0.021998	1.26021	-1.26021
18	0.301397	0.044979	-0.044979	0.004668	-0.004667	0.26744	-0.26740
19	0.330304	0.044875	-0.044875	-0.010551	0.010551	-0.60449	0.60450
20	0.358692	0.044405	-0.044405	-0.022134	0.022134	-1.26800	1.26800
21	0.386739	0.043650	-0.043650	-0.031514	0.031514	-1.80502	1.80502
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27008	2.27009
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68097	2.68099
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498727	0.038478	-0.038478	-0.058418	0.058418	-3.34329	3.34329
26	0.527191	0.036746	-0.036746	-0.063162	0.063162	-3.61409	3.61409
27	0.555942	0.034867	-0.034867	-0.067421	0.067421	-3.85708	3.85708
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614323	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973
30	0.643917	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673728	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47191

32	0.703660	0.023833	-0.023833	-0.079562	0.079562	-4.54900	4.54901
33	0.733644	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792685	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848120	0.012225	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=20 Y= 1.5545 ETA = 0.6909 CHORD = 0.6068 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871694	-0.871669	41.07848	-41.07765
2	0.011998	0.012073	-0.012073	0.493276	-0.493283	26.25603	-26.25632
3	0.020075	0.015522	-0.015522	0.375060	-0.375054	20.55908	-20.55878
4	0.028337	0.018326	-0.018326	0.309346	-0.309343	17.18921	-17.18909
5	0.036940	0.020784	-0.020784	0.265198	-0.265198	14.85283	-14.85281
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04842
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56116	-11.56110
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26728	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08430	-9.08424
10	0.094694	0.031738	-0.031739	0.140204	-0.140203	7.98109	-7.98104
11	0.112099	0.034009	-0.034009	0.121324	-0.121323	6.91755	-6.91751
12	0.132589	0.036303	-0.036303	0.103168	-0.103167	5.89026	-5.89021
13	0.156363	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88826
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212011	0.042343	-0.042343	0.052493	-0.052493	3.00487	-3.00486
16	0.241916	0.043682	-0.043682	0.037136	-0.037136	2.12676	-2.12675
17	0.271887	0.044568	-0.044568	0.021999	-0.021999	1.26024	-1.26025
18	0.301397	0.044979	-0.044979	0.004668	-0.004667	0.26744	-0.26742
19	0.330303	0.044875	-0.044875	-0.010550	0.010551	-0.60447	0.60448
20	0.358692	0.044405	-0.044405	-0.022134	0.022135	-1.26800	1.26801
21	0.386738	0.043650	-0.043650	-0.031513	0.031514	-1.80498	1.80500
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27006	2.27008
23	0.442512	0.041448	-0.041448	-0.046826	0.046826	-2.68096	2.68097
24	0.470518	0.040050	-0.040050	-0.052921	0.052921	-3.02934	3.02934
25	0.498726	0.038478	-0.038478	-0.058418	0.058418	-3.34329	3.34329
26	0.527191	0.036746	-0.036746	-0.063162	0.063161	-3.61409	3.61408
27	0.555942	0.034867	-0.034867	-0.067421	0.067421	-3.85708	3.85708
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05799	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973
30	0.643917	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703680	0.023833	-0.023833	-0.079562	0.079562	-4.54900	4.54901
33	0.733644	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239
34	0.763415	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792686	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60031
37	0.848121	0.012224	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897202	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60281
41	0.940143	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60259
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=21 Y= 1.6364 ETA = 0.7273 CHORD = 0.5795 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL

1	0.003995	0.007009	-0.007009	0.871695	-0.871670	41.07849	-41.07767
2	0.011998	0.012073	-0.012073	0.493292	-0.493285	26.25674	-26.25642
3	0.020075	0.015522	-0.015522	0.375061	-0.375055	20.55908	-20.55879
4	0.028337	0.018326	-0.018326	0.309346	-0.309343	17.18921	-17.18909
5	0.036939	0.020784	-0.020784	0.265198	-0.265198	14.85284	-14.85283
6	0.046093	0.023052	-0.023052	0.231759	-0.231759	13.04844	-13.04844
7	0.056066	0.025221	-0.025221	0.204564	-0.204563	11.56117	-11.56111
8	0.067197	0.027362	-0.027362	0.181141	-0.181141	10.26729	-10.26729
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08431	-9.08424
10	0.094694	0.031739	-0.031739	0.140204	-0.140204	7.98109	-7.98105
11	0.112097	0.034009	-0.034009	0.121325	-0.121325	6.91760	-6.91759
12	0.132586	0.036303	-0.036303	0.103169	-0.103168	5.89031	-5.89028
13	0.156361	0.038540	-0.038540	0.085525	-0.085525	4.88831	-4.88832
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92758
15	0.212011	0.042343	-0.042343	0.052493	-0.052493	3.00487	-3.00486
16	0.241917	0.043682	-0.043682	0.037136	-0.037136	2.12673	-2.12674
17	0.271887	0.044568	-0.044568	0.021999	-0.021999	1.26024	-1.26023
18	0.301397	0.044979	-0.044979	0.004667	-0.004667	0.26740	-0.26739
19	0.330303	0.044875	-0.044875	-0.010550	0.010551	-0.60447	0.60449
20	0.358692	0.044405	-0.044405	-0.022134	0.022135	-1.26801	1.26801
21	0.386737	0.043650	-0.043650	-0.031513	0.031514	-1.80498	1.80500
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27008	2.27010
23	0.442512	0.041448	-0.041448	-0.046826	0.046826	-2.68096	2.68097
24	0.470518	0.040050	-0.040050	-0.052921	0.052921	-3.02933	3.02934
25	0.498727	0.038478	-0.038478	-0.058418	0.058418	-3.34330	3.34331
26	0.527191	0.036746	-0.036746	-0.063161	0.063161	-3.61408	3.61408
27	0.555942	0.034867	-0.034867	-0.067421	0.067421	-3.85708	3.85708
28	0.584989	0.032857	-0.032857	-0.070944	0.070944	-4.05798	4.05798
29	0.614323	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973
30	0.643916	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673729	0.026199	-0.026199	-0.078209	0.078209	-4.47192	4.47192
32	0.703680	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733645	0.021437	-0.021437	-0.080325	0.080324	-4.59240	4.59239
34	0.763415	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792686	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821061	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848120	0.012224	-0.012224	-0.080499	0.080499	-4.60231	4.60231
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897202	0.008274	-0.008274	-0.080456	0.080456	-4.59989	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940141	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K=22 Y= 1.7182 ETA = 0.7636 CHORD = 0.5523 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003994	0.007008	-0.007008	0.871740	-0.871759	41.07994	-41.08058
2	0.011998	0.012073	-0.012073	0.493292	-0.493287	26.25673	-26.25652
3	0.020074	0.015522	-0.015522	0.375070	-0.375066	20.55956	-20.55936
4	0.028335	0.018325	-0.018326	0.309357	-0.309351	17.18980	-17.18947
5	0.036938	0.020784	-0.020784	0.265202	-0.265202	14.85305	-14.85305
6	0.046092	0.023051	-0.023051	0.231762	-0.231761	13.04861	-13.04854
7	0.056065	0.025221	-0.025221	0.204567	-0.204566	11.56129	-11.56124
8	0.067196	0.027362	-0.027362	0.181143	-0.181143	10.26737	-10.26737
9	0.079905	0.029525	-0.029525	0.159895	-0.159894	9.08439	-9.08436
10	0.094694	0.031739	-0.031739	0.140204	-0.140204	7.98109	-7.98108
11	0.112098	0.034009	-0.034009	0.121324	-0.121324	6.91755	-6.91755
12	0.132589	0.036303	-0.036303	0.103168	-0.103168	5.89027	-5.89024
13	0.156362	0.038540	-0.038540	0.085525	-0.085525	4.88831	-4.88831
14	0.183119	0.040597	-0.040597	0.068657	-0.068657	3.92761	-3.92760
15	0.212010	0.042343	-0.042343	0.052493	-0.052493	3.00490	-3.00488
16	0.241917	0.043682	-0.043682	0.037136	-0.037136	2.12673	-2.12674

17	0.271887	0.044568	-0.044568	0.021999	-0.021999	1.26024	-1.26023
18	0.301397	0.044979	-0.044979	0.004668	-0.004667	0.26744	-0.26740
19	0.330302	0.044875	-0.044875	-0.010550	0.010550	-0.60445	0.60446
20	0.358693	0.044405	-0.044405	-0.022135	0.022135	-1.26803	1.26802
21	0.386736	0.043650	-0.043650	-0.031514	0.031514	-1.80500	1.80501
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27006	2.27009
23	0.442513	0.041448	-0.041448	-0.046826	0.046826	-2.68098	2.68098
24	0.470518	0.040050	-0.040050	-0.052921	0.052921	-3.02934	3.02934
25	0.498727	0.038478	-0.038477	-0.058418	0.058418	-3.34330	3.34331
26	0.527191	0.036746	-0.036746	-0.063161	0.063161	-3.61406	3.61408
27	0.555942	0.034867	-0.034867	-0.067421	0.067421	-3.85708	3.85709
28	0.584989	0.032857	-0.032857	-0.070944	0.070944	-4.05796	4.05798
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22974	4.22974
30	0.643918	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673728	0.026199	-0.026199	-0.078209	0.078209	-4.47191	4.47192
32	0.703680	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733645	0.021437	-0.021437	-0.080325	0.080324	-4.59240	4.59239
34	0.763416	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792685	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821060	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848119	0.012225	-0.012225	-0.080499	0.080499	-4.60231	4.60231
38	0.873537	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59989	4.59988
40	0.919276	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960283	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

K=23 Y= 1.8000 ETA = 0.8000 CHORD = 0.5250 TWIST ANGLE = 0.0

M	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007008	-0.007009	0.871739	-0.871713	41.07991	-41.07909
2	0.011998	0.012073	-0.012073	0.493291	-0.493285	26.25671	-26.25644
3	0.020074	0.015522	-0.015522	0.375070	-0.375066	20.55952	-20.55933
4	0.028336	0.018326	-0.018326	0.309351	-0.309347	17.18951	-17.18930
5	0.036939	0.020784	-0.020784	0.265202	-0.265200	14.85303	-14.85292
6	0.046092	0.023051	-0.023051	0.231762	-0.231760	13.04859	-13.04850
7	0.056065	0.025221	-0.025221	0.204566	-0.204564	11.56128	-11.56117
8	0.067195	0.027362	-0.027362	0.181144	-0.181144	10.26746	-10.26744
9	0.079905	0.029525	-0.029525	0.159895	-0.159894	9.08438	-9.08435
10	0.094693	0.031738	-0.031738	0.140204	-0.140204	7.98108	-7.98108
11	0.112097	0.034009	-0.034009	0.121325	-0.121325	6.91759	-6.91758
12	0.132588	0.036303	-0.036303	0.103169	-0.103168	5.89030	-5.89027
13	0.156362	0.038540	-0.038540	0.085524	-0.085524	4.88827	-4.88827
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92756
15	0.212010	0.042343	-0.042343	0.052493	-0.052493	3.00489	-3.00488
16	0.241917	0.043682	-0.043682	0.037135	-0.037136	2.12673	-2.12674
17	0.271888	0.044568	-0.044568	0.021999	-0.021999	1.26024	-1.26022
18	0.301397	0.044979	-0.044979	0.004668	-0.004667	0.26744	-0.26740
19	0.330303	0.044875	-0.044875	-0.010550	0.010551	-0.60447	0.60449
20	0.358692	0.044405	-0.044405	-0.022134	0.022134	-1.26800	1.26800
21	0.386737	0.043650	-0.043650	-0.031513	0.031513	-1.80498	1.80499
22	0.414626	0.042655	-0.042655	-0.039641	0.039641	-2.27008	2.27009
23	0.442512	0.041448	-0.041448	-0.046826	0.046826	-2.68096	2.68097
24	0.470519	0.040050	-0.040050	-0.052921	0.052921	-3.02935	3.02935
25	0.498726	0.038478	-0.038478	-0.058418	0.058418	-3.34328	3.34328
26	0.527191	0.036746	-0.036746	-0.063161	0.063161	-3.61408	3.61408
27	0.555942	0.034867	-0.034867	-0.067421	0.067421	-3.85708	3.85709
28	0.584990	0.032856	-0.032856	-0.070944	0.070944	-4.05798	4.05799
29	0.614324	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973
30	0.643917	0.028504	-0.028504	-0.076379	0.076379	-4.36772	4.36772
31	0.673727	0.026199	-0.026199	-0.078208	0.078209	-4.47190	4.47191
32	0.703680	0.023833	-0.023833	-0.079562	0.079562	-4.54900	4.54901
33	0.733645	0.021437	-0.021437	-0.080324	0.080324	-4.59239	4.59239

[illegible]	[illegible]

TWIST ANGLE = 0.0

[illegible]	DQZU	DQZL
[illegible]	[illegible]	-41.27767
[illegible]	[illegible]	-35.25763
[illegible]	[illegible]	-23.55568
[illegible]	[illegible]	-17.18932
[illegible]	[illegible]	-14.65322
[illegible]	[illegible]	-13.24866
[illegible]	[illegible]	-11.56125
[illegible]	[illegible]	-10.26733
[illegible]	[illegible]	-9.06434
[illegible]	[illegible]	-7.46154
[illegible]	[illegible]	-6.41761
[illegible]	[illegible]	-5.69631
[illegible]	[illegible]	-4.65830
[illegible]	[illegible]	-3.92758
[illegible]	[illegible]	-3.00488
[illegible]	[illegible]	-2.12677
[illegible]	[illegible]	-1.26025
[illegible]	[illegible]	-0.26745
[illegible]	[illegible]	0.60449
[illegible]	[illegible]	1.25800
[illegible]	[illegible]	1.80563
[illegible]	[illegible]	2.27008
[illegible]	[illegible]	2.68097
[illegible]	[illegible]	3.02935
[illegible]	[illegible]	3.34310
[illegible]	[illegible]	3.61408
[illegible]	[illegible]	3.85709
[illegible]	[illegible]	4.05799
[illegible]	[illegible]	4.22973
[illegible]	[illegible]	4.36773
[illegible]	[illegible]	4.47192
[illegible]	[illegible]	4.54901
[illegible]	[illegible]	4.59239
[illegible]	[illegible]	4.60211
[illegible]	[illegible]	4.60232
[illegible]	[illegible]	4.60032
[illegible]	[illegible]	4.60221
[illegible]	[illegible]	4.60202
[illegible]	[illegible]	4.59988
[illegible]	[illegible]	4.60262
[illegible]	[illegible]	4.60260
[illegible]	[illegible]	4.60112
[illegible]	[illegible]	4.60128
[illegible]	[illegible]	4.60124

TWIST ANGLE = 0.0

[illegible]	DQZU	DQZL
[illegible]	[illegible]	-41.08208

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.493313	26.25745	-26.25772
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.375063	20.55956	-20.55920
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	17.16982	-17.18953
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.265202	14.85306	-14.85306
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.231765	13.04878	-13.04876
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.204565	11.56130	-11.56127
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.181143	10.26738	-10.26743
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	9.08440	-9.08431
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.140204	7.98110	-7.98108
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.121324	6.91756	-6.91754
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.103168	5.89028	-5.89024
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.085525	4.88835	-4.88833
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.068657	3.92761	-3.92759
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.052493	3.00490	-3.00488
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.037136	2.12676	-2.12676
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.021999	1.26024	-1.26023
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.004667	0.26744	-0.26742
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.010551	-0.60447	0.60449
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.022134	-1.26799	1.26799
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.031534	-1.80502	1.80503
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.039641	-2.27008	2.27010
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.046826	-2.68097	2.68097
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.052921	-3.02934	3.02935
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.058418	-3.34329	3.34329
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.063162	-3.61409	3.61409
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.067421	-3.85709	3.85709
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.070944	-4.05798	4.05799
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.073957	-4.22974	4.22974
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.076379	-4.36773	4.36773
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.078209	-4.47192	4.47192
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.079563	-4.54901	4.54901
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080325	-4.59240	4.59240
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080495	-4.60212	4.60212
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080499	-4.60233	4.60232
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080464	-4.60032	4.60032
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080499	-4.60231	4.60231
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080494	-4.60202	4.60202
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080456	-4.59989	4.59989
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080508	-4.60282	4.60282
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080504	-4.60260	4.60260
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080478	-4.60112	4.60112
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080481	-4.60128	4.60128
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0.080480	-4.60124	4.60124

[illegible] CHORD = 0.4432 TWIST ANGLE = 0.0

[illegible]	[illegible]	[illegible]	[illegible]	DZU/DX	DZL/DX	DDZU	DDZL
[illegible]	[illegible]	[illegible]	[illegible]	0.871784	-0.871759	41.08139	-41.08057
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-0.493311	26.25742	-26.25760
[illegible]	[illegible]	[illegible]	[illegible]	0.375069	-0.375061	20.55951	-20.55908
[illegible]	[illegible]	[illegible]	[illegible]	0.309351	-0.309348	17.16951	-17.18932
[illegible]	[illegible]	[illegible]	[illegible]	0.265202	-0.265199	14.85303	-14.85289
[illegible]	[illegible]	[illegible]	[illegible]	0.231765	-0.231764	13.04876	-13.04873
[illegible]	[illegible]	[illegible]	[illegible]	0.204567	-0.204565	11.56129	-11.56118
[illegible]	[illegible]	[illegible]	[illegible]	0.181144	-0.181145	10.26746	-10.26749
[illegible]	[illegible]	[illegible]	[illegible]	0.159895	-0.159893	9.08439	-9.08430
[illegible]	[illegible]	[illegible]	[illegible]	0.140204	-0.140204	7.98109	-7.98108
[illegible]	[illegible]	[illegible]	[illegible]	0.121324	-0.121324	6.91754	-6.91757
[illegible]	[illegible]	[illegible]	[illegible]	0.103169	-0.103168	5.89031	-5.89027
[illegible]	[illegible]	[illegible]	[illegible]	0.085525	-0.085524	4.88831	-4.88829
[illegible]	[illegible]	[illegible]	[illegible]	0.068658	-0.068657	3.92764	-3.92761
[illegible]	[illegible]	[illegible]	[illegible]	0.052493	-0.052493	3.00489	-3.00489
[illegible]	[illegible]	[illegible]	[illegible]	0.037136	-0.037136	2.12676	-2.12675
[illegible]	[illegible]	[illegible]	[illegible]	0.021998	-0.021999	1.26021	-1.26022
[illegible]	[illegible]	[illegible]	[illegible]	0.004668	-0.004667	0.26744	-0.26742

N	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
[illegible]	[illegible]	[illegible]	-0.044875	-0.010550	0.010550	-0.60447	0.60448
[illegible]	[illegible]	[illegible]	-0.044405	-0.022134	0.022135	-1.26800	1.26801
[illegible]	[illegible]	[illegible]	-0.043650	-0.031514	0.031514	-1.80500	1.80501
[illegible]	[illegible]	[illegible]	-0.042665	-0.039641	0.039641	-2.27008	2.27010
[illegible]	[illegible]	[illegible]	-0.041448	-0.046826	0.046826	-2.66097	2.68098
[illegible]	[illegible]	[illegible]	-0.040050	-0.052921	0.052921	-3.02933	3.02933
[illegible]	[illegible]	[illegible]	-0.038478	-0.058416	0.058416	-3.34328	3.34329
[illegible]	[illegible]	[illegible]	-0.036746	-0.063161	0.063161	-3.61408	3.61408
[illegible]	[illegible]	[illegible]	-0.034867	-0.067421	0.067421	-3.85708	3.85709
[illegible]	[illegible]	[illegible]	-0.032857	-0.070944	0.070944	-4.05797	4.05798
[illegible]	[illegible]	[illegible]	-0.030729	-0.073957	0.073957	-4.22973	4.22973
[illegible]	[illegible]	[illegible]	-0.028504	-0.076379	0.076379	-4.36773	4.36773
[illegible]	[illegible]	[illegible]	-0.026199	-0.078209	0.078209	-4.47191	4.47192
[illegible]	[illegible]	[illegible]	-0.023833	-0.079562	0.079562	-4.54901	4.54901
[illegible]	[illegible]	[illegible]	-0.021437	-0.080325	0.080324	-4.59240	4.59239
[illegible]	[illegible]	[illegible]	-0.019042	-0.080495	0.080495	-4.60211	4.60211
[illegible]	[illegible]	[illegible]	-0.016665	-0.080499	0.080499	-4.60232	4.60232
[illegible]	[illegible]	[illegible]	-0.014402	-0.080464	0.080464	-4.60032	4.60031
[illegible]	[illegible]	[illegible]	-0.012224	-0.080499	0.080499	-4.60230	4.60230
[illegible]	[illegible]	[illegible]	-0.010178	-0.080494	0.080494	-4.60201	4.60202
[illegible]	[illegible]	[illegible]	-0.008274	-0.080456	0.080456	-4.59989	4.59988
[illegible]	[illegible]	[illegible]	-0.006497	-0.080508	0.080508	-4.60282	4.60281
[illegible]	[illegible]	[illegible]	-0.004818	-0.080504	0.080504	-4.60260	4.60259
[illegible]	[illegible]	[illegible]	-0.003196	-0.080478	0.080478	-4.60112	4.60112
[illegible]	[illegible]	[illegible]	-0.001568	-0.080480	0.080481	-4.60127	4.60128
[illegible]	[illegible]	[illegible]	-0.000000	-0.080480	0.080480	-4.60123	4.60124

[illegible] ETA = 0.9455 CHORD = 0.4159 TWIST ANGLE = 0.0

N	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
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[illegible]	[illegible]	[illegible]	-0.012072	0.493306	-0.493307	26.25740	-26.25745
[illegible]	[illegible]	[illegible]	-0.015522	0.375060	-0.375058	20.55907	-20.55894
[illegible]	[illegible]	[illegible]	-0.018326	0.309345	-0.309343	17.18919	-17.18907
[illegible]	[illegible]	[illegible]	-0.020784	0.265206	-0.265205	14.85324	-14.85320
[illegible]	[illegible]	[illegible]	-0.023051	0.231765	-0.231764	13.04876	-13.04870
[illegible]	[illegible]	[illegible]	-0.025221	0.204571	-0.204568	11.56152	-11.56138
[illegible]	[illegible]	[illegible]	-0.027362	0.181142	-0.181142	10.26736	-10.26735
[illegible]	[illegible]	[illegible]	-0.029525	0.159893	-0.159893	9.08430	-9.08428
[illegible]	[illegible]	[illegible]	-0.031738	0.140204	-0.140204	7.98108	-7.98108
[illegible]	[illegible]	[illegible]	-0.034009	0.121325	-0.121325	6.91759	-6.91761
[illegible]	[illegible]	[illegible]	-0.036303	0.103170	-0.103169	5.89035	-5.89030
[illegible]	[illegible]	[illegible]	-0.038540	0.085525	-0.085525	4.88834	-4.88833
[illegible]	[illegible]	[illegible]	-0.040597	0.068658	-0.068658	3.92767	-3.92764
[illegible]	[illegible]	[illegible]	-0.042363	0.052494	-0.052494	3.00492	-3.00490
[illegible]	[illegible]	[illegible]	-0.043682	0.037135	-0.037136	2.12673	-2.12674
[illegible]	[illegible]	[illegible]	-0.044568	0.021999	-0.021999	1.26027	-1.26027
[illegible]	[illegible]	[illegible]	-0.044979	0.004666	-0.004667	0.26743	-0.26742
[illegible]	[illegible]	[illegible]	-0.044875	-0.010550	0.010550	-0.60445	0.60446
[illegible]	[illegible]	[illegible]	-0.044405	-0.022134	0.022134	-1.26798	1.26799
[illegible]	[illegible]	[illegible]	-0.043650	-0.031513	0.031513	-1.80498	1.80499
[illegible]	[illegible]	[illegible]	-0.042665	-0.039641	0.039641	-2.27005	2.27006
[illegible]	[illegible]	[illegible]	-0.041448	-0.046826	0.046826	-2.68096	2.68096
[illegible]	[illegible]	[illegible]	-0.040050	-0.052921	0.052921	-3.02933	3.02934
[illegible]	[illegible]	[illegible]	-0.038478	-0.058418	0.058418	-3.34329	3.34329
[illegible]	[illegible]	[illegible]	-0.036746	-0.063162	0.063162	-3.61409	3.61409
[illegible]	[illegible]	[illegible]	-0.034867	-0.067421	0.067421	-3.85709	3.85709
[illegible]	[illegible]	[illegible]	-0.032857	-0.070944	0.070944	-4.05797	4.05797
[illegible]	[illegible]	[illegible]	-0.030729	-0.073957	0.073957	-4.22973	4.22973
[illegible]	[illegible]	[illegible]	-0.028504	-0.076379	0.076379	-4.36773	4.36773
[illegible]	[illegible]	[illegible]	-0.026199	-0.078208	0.078209	-4.47191	4.47192
[illegible]	[illegible]	[illegible]	-0.023833	-0.079562	0.079562	-4.54900	4.54900
[illegible]	[illegible]	[illegible]	-0.021437	-0.080324	0.080324	-4.59239	4.59239
[illegible]	[illegible]	[illegible]	-0.019042	-0.080495	0.080495	-4.60211	4.60211
[illegible]	[illegible]	[illegible]	-0.016686	-0.080499	0.080499	-4.60232	4.60231

36	0.821060	0.014402	-0.014402	-0.080464	0.080464	-4.60031	4.60031
37	0.848120	0.012225	-0.012224	-0.080499	0.080499	-4.60230	4.60230
38	0.873537	0.010178	-0.010178	-0.080493	0.080493	-4.60201	4.60201
39	0.897203	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919275	0.006497	-0.006497	-0.080508	0.080508	-4.60281	4.60281
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60259	4.60259
42	0.960283	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60111
43	0.980145	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999998	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60123

K=28 Y= 2.2091 ETA = 0.9818 CHORD = 0.3886 TWIST ANGLE = 0.0

#	X/C	ZU/C	ZL/C	DZU/DX	DZL/DX	DDZU	DDZL
1	0.003995	0.007009	-0.007009	0.871695	-0.871714	41.07848	-41.07912
2	0.011997	0.012072	-0.012073	0.493306	-0.493304	26.25742	-26.25729
3	0.020075	0.015522	-0.015522	0.375061	-0.375056	20.55908	-20.55884
4	0.028335	0.018325	-0.018325	0.309357	-0.309353	17.18980	-17.18958
5	0.036939	0.020784	-0.020784	0.265202	-0.265202	14.85305	-14.85304
6	0.046092	0.023051	-0.023051	0.231765	-0.231763	13.04877	-13.04867
7	0.05[illegible]364	0.025221	-0.025221	0.204569	-0.204567	11.56141	-11.56129
8	0.067195	0.027362	-0.027362	0.181144	-0.181144	10.26747	-10.26744
9	0.079906	0.029525	-0.029525	0.159893	-0.159892	9.08431	-9.08425
10	0.094693	0.031738	-0.031739	0.140204	-0.140204	7.98109	-7.98108
11	0.112096	0.034009	-0.034009	0.121326	-0.121326	6.91766	-6.91765
12	0.132589	0.036303	-0.036303	0.103168	-0.103168	5.89026	-5.89023
13	0.156362	0.038540	-0.038540	0.085524	-0.085524	4.88828	-4.88828
14	0.183120	0.040597	-0.040597	0.068657	-0.068657	3.92758	-3.92758
15	0.212009	0.042343	-0.042343	0.052494	-0.052493	3.00492	-3.00490
16	0.241915	0.043682	-0.043682	0.037136	-0.037137	2.12679	-2.12679
17	0.271867	0.044568	-0.044568	0.021999	-0.021999	1.26024	-1.26025
18	0.301395	0.044979	-0.044979	0.004669	-0.004668	0.26751	-0.26748
19	0.330302	0.044875	-0.044875	-0.010550	0.010550	-0.60445	0.60446
20	0.358691	0.044405	-0.044405	-0.022134	0.022134	-1.26799	1.26798
21	0.386737	0.043650	-0.043650	-0.031513	0.031513	-1.80498	1.80498
22	0.414625	0.042656	-0.042655	-0.039641	0.039641	-2.27007	2.27008
23	0.442511	0.041448	-0.041448	-0.046826	0.046826	-2.68096	2.68096
24	0.470518	0.040050	-0.040050	-0.052921	0.052921	-3.02933	3.02934
25	0.498725	0.038478	-0.038478	-0.058418	0.058418	-3.34328	3.34328
26	0.527190	0.036746	-0.036746	-0.063161	0.063161	-3.61408	3.61408
27	0.555943	0.034867	-0.034867	-0.067421	0.067421	-3.85709	3.85709
28	0.584989	0.032857	-0.032856	-0.070944	0.070944	-4.05798	4.05799
29	0.614323	0.030729	-0.030729	-0.073957	0.073957	-4.22973	4.22973
30	0.643917	0.028504	-0.028504	-0.076379	0.076379	-4.36773	4.36773
31	0.673727	0.026199	-0.026199	-0.078208	0.078209	-4.47191	4.47192
32	0.703660	0.023833	-0.023833	-0.079562	0.079562	-4.54901	4.54901
33	0.733644	0.021437	-0.021437	-0.080325	0.080324	-4.59240	4.59239
34	0.763415	0.019042	-0.019042	-0.080495	0.080495	-4.60211	4.60211
35	0.792685	0.016686	-0.016686	-0.080499	0.080499	-4.60232	4.60232
36	0.821059	0.014402	-0.014402	-0.080464	0.080464	-4.60032	4.60032
37	0.848118	0.012225	-0.012225	-0.080499	0.080499	-4.60231	4.60231
38	0.873536	0.010178	-0.010178	-0.080494	0.080494	-4.60201	4.60202
39	0.897201	0.008274	-0.008274	-0.080456	0.080456	-4.59988	4.59988
40	0.919277	0.006497	-0.006497	-0.080508	0.080508	-4.60282	4.60282
41	0.940142	0.004818	-0.004818	-0.080504	0.080504	-4.60260	4.60260
42	0.960284	0.003196	-0.003196	-0.080478	0.080478	-4.60112	4.60112
43	0.980146	0.001598	-0.001598	-0.080480	0.080481	-4.60127	4.60128
44	0.999997	0.000000	-0.000000	-0.080480	0.080480	-4.60123	4.60124

RESIDUAL PARAMETERS

MESH	ITER	ERROR	ERRAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJRSD	KPJ
FINE	101	0.1784E-01	0.1827E-02	58	29	16	0.3414E+03	0.1152E+02	8	29	17	5089	0.1173E+00	0.5186E-02	29
COARSE	102	0.4437E-01	0.8454E-03	16	1	11	0.4991E+01	0.3775E-01	16	1	11	28			
FINE	103	0.1493E-01	0.9229E-03	58	29	14	0.1860E+03	0.7187E+01	8	20	11	5039	0.1164E+00	0.6256E-03	13
COARSE	104	0.1523E-01	0.4368E-03	17	2	11	0.1437E+01	0.1690E-01	18	4	11	30			
FINE	105	0.1069E-01	0.5484E-03	58	28	15	0.1436E+03	0.3370E+01	9	28	17	5042	0.1172E+00	0.1929E-03	1
COARSE	106	0.1016E-01	0.3001E-03	19	1	11	0.7811E+00	0.1069E-01	18	1	11	30			
FINE	107	0.6658E-02	0.3721E-03	57	28	15	0.9690E+02	0.2343E+01	9	27	17	5016	0.1172E+00	0.1469E-03	6
COARSE	108	0.6282E-02	0.2327E-03	16	1	12	0.5042E+00	0.7900E-02	17	1	11	35			
FINE	109	0.4875E-02	0.2617E-03	58	27	17	0.6094E+02	0.1709E+01	8	28	10	5016	0.1173E+00	0.1144E-03	6
COARSE	110	0.4232E-02	0.1909E-03	18	1	13	0.2798E+00	0.6283E-02	17	1	11	37			
FINE	111	0.3170E-02	0.1897E-03	57	27	17	0.1057E+03	0.1283E+01	8	28	10	5028	0.1173E+00	0.9639E-04	22
COARSE	112	0.3560E-02	0.1613E-03	17	1	13	0.2014E+00	0.5167E-02	17	1	13	39			
FINE	113	0.2150E-02	0.1481E-03	57	26	17	0.8887E+02	0.1042E+01	8	28	10	5022	0.1174E+00	0.8486E-04	22
COARSE	114	0.2791E-02	0.1394E-03	17	1	13	0.1604E+00	0.4366E-02	16	1	13	42			
FINE	115	0.1559E-02	0.1222E-03	58	11	18	0.3990E+02	0.8089E+00	8	28	10	5042	0.1175E+00	0.6840E-04	20
COARSE	116	0.2179E-02	0.1225E-03	16	1	13	0.1230E+00	0.3764E-02	16	1	13	42			
FINE	117	0.1351E-02	0.1073E-03	58	9	18	0.3295E+02	0.7135E+00	8	29	9	5048	0.1175E+00	0.5172E-04	20
COARSE	118	0.1829E-02	0.1094E-03	23	1	14	0.1081E+00	0.3304E-02	20	1	14	42			
FINE	119	0.1241E-02	0.9494E-04	58	10	19	0.2061E+02	0.6192E+00	8	27	8	5036	0.1176E+00	0.5582E-04	1
COARSE	120	0.1608E-02	0.9887E-04	19	1	14	0.9394E-01	0.2939E-02	20	1	14	42			

RESIDUAL PARAMETERS

MESH	ITER	ERROR	ERRAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJRSD	KPJ
FINE	121	0.1143E-02	0.8544E-04	58	9	19	0.2242E+02	0.5583E+00	8	29	9	5029	0.1177E+00	0.6893E-04	1
COARSE	122	0.1413E-02	0.9009E-04	18	1	14	0.7939E-01	0.2645E-02	20	1	14	43			
FINE	123	0.1048E-02	0.7696E-04	58	8	19	0.1936E+02	0.4905E+00	10	29	8	5013	0.1177E+00	0.4803E-04	1

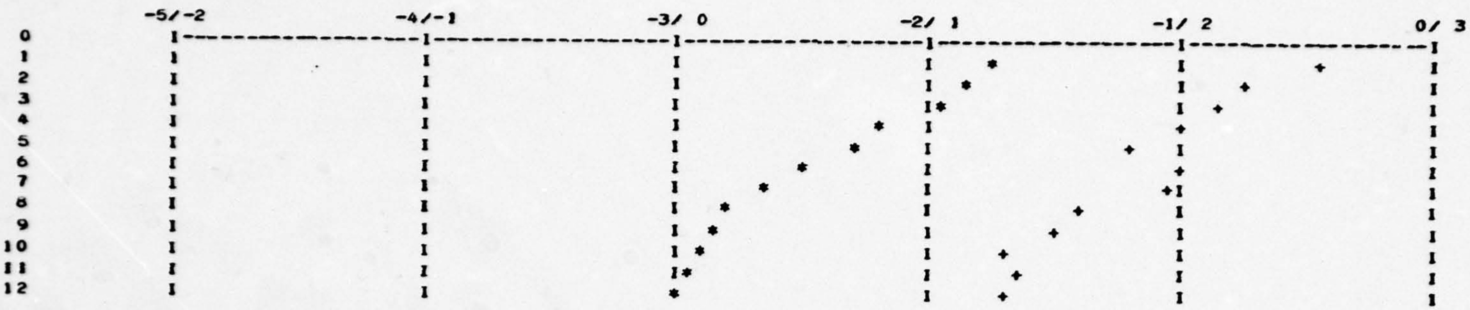
PROBLEM NO. 24-CL EFFECTIVELY CONSTANT. INVISCID SOLUTION HALTS.

PJUMP RESIDUALS , K=1,KTIP-1

0.4803E-04	0.3189E-04	0.3237E-04	0.3272E-04	0.7059E-05	0.1672E-04
0.1184E-04	0.2471E-04	0.2879E-04	0.1556E-04	0.2804E-04	0.2493E-04
0.3875E-04	0.3597E-04	0.4368E-04	0.3869E-04	0.4049E-04	0.3938E-04
0.4270E-04	0.3998E-04	0.3000E-04	0.8393E-05	-0.6422E-05	-0.7745E-05
-0.3628E-05	-0.6650E-05	-0.1214E-04	-0.1058E-04		

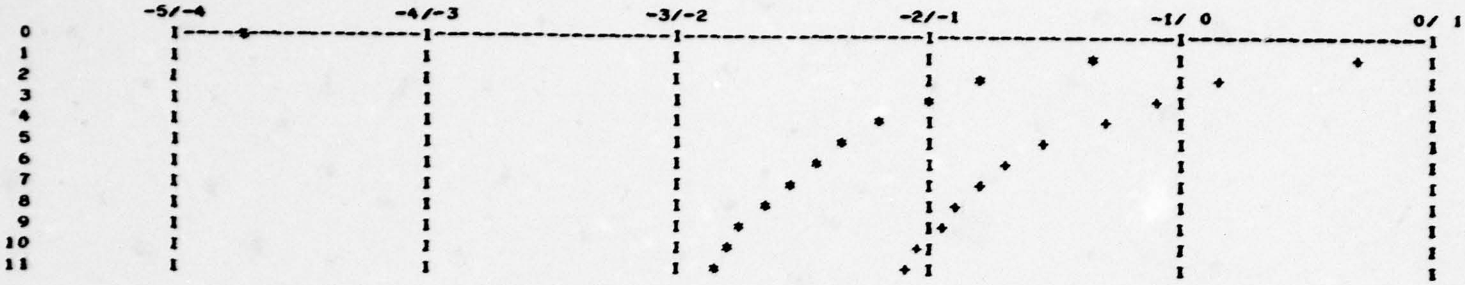
ERPLOT FOR FINE MESH

INITIAL ERROR(*) IS 0.1784E-01 INITIAL RESIDUAL(+) IS 0.3414E+03



ERPLOT FOR COARSE MESH

INITIAL ERROR(*) IS 0.4437E-01 INITIAL RESIDUAL(+) IS .0.4991E+01



VISCOUS FLOW CALCULATION

ITERATION NO.. 1 ON GRID NO. 1

LIFT FROM INTEGRATION OF DELTA PHI AT TE IS 0.11778E+00

TOTAL CHANGE OF PRESSURE SOLUTION

TOP IS 0.2207E+06 BOTTOM IS 0.2365E+06 IN TERMS OF THE CONVERGENCE CRITERION

UPPER SURFACE

SPAN STATION	MAX CP CHANGE	NEW CP AT MAX CHANGES	OLD CP AT MAX CHANGE	LOCATION OF MAX CHGE	AVERAGE CHANGE
1	2.98	0.97562E+00	-0.20000E+01	1	1.86
2	2.67	0.67250E+00	-0.20000E+01	1	1.83
3	2.61	0.60883E+00	-0.20000E+01	1	1.81
4	2.57	0.56813E+00	-0.20000E+01	1	1.80
5	2.54	0.53737E+00	-0.20000E+01	1	1.79
6	2.51	0.51168E+00	-0.20000E+01	1	1.79
7	2.49	0.48908E+00	-0.20000E+01	1	1.78
8	2.47	0.46896E+00	-0.20000E+01	1	1.78
9	2.45	0.45160E+00	-0.20000E+01	1	1.77
10	2.44	0.43593E+00	-0.20000E+01	1	1.77
11	2.42	0.42211E+00	-0.20000E+01	1	1.77
12	2.41	0.40930E+00	-0.20000E+01	1	1.77
13	2.40	0.39794E+00	-0.20000E+01	1	1.77
14	2.39	0.38706E+00	-0.20000E+01	1	1.77
15	2.38	0.37743E+00	-0.20000E+01	1	1.77
16	2.37	0.36798E+00	-0.20000E+01	1	1.77
17	2.36	0.35786E+00	-0.20000E+01	1	1.77
18	2.35	0.34626E+00	-0.20000E+01	1	1.78
19	2.33	0.33402E+00	-0.20000E+01	1	1.78
20	2.32	0.32148E+00	-0.20000E+01	1	1.78
21	2.31	0.30924E+00	-0.20000E+01	1	1.78
22	2.30	0.30262E+00	-0.20000E+01	44	1.78
23	2.30	0.29687E+00	-0.20000E+01	44	1.79
24	2.29	0.29363E+00	-0.20000E+01	44	1.79
25	2.29	0.29373E+00	-0.20000E+01	44	1.80
26	2.29	0.28954E+00	-0.20000E+01	44	1.81
27	2.27	0.27332E+00	-0.20000E+01	44	1.83
28	2.22	0.22207E+00	-0.20000E+01	44	1.84

LOWER SURFACE

SPAN STATION	MAX CP CHANGE	NEW CP AT MAX CHANGES	OLD CP AT MAX CHANGE	LOCATION OF MAX CHGE	AVERAGE CHANGE
1	3.07	0.10694E+01	-0.20000E+01	1	1.95
2	2.81	0.80667E+00	-0.20000E+01	1	1.92
3	2.76	0.76347E+00	-0.20000E+01	1	1.91
4	2.74	0.73668E+00	-0.20000E+01	1	1.90
5	2.72	0.71657E+00	-0.20000E+01	1	1.90
6	2.70	0.69967E+00	-0.20000E+01	1	1.90
7	2.68	0.68406E+00	-0.20000E+01	1	1.89

8	2.67	0.66978E+00	-0.20000E+01	1	1.89
9	2.66	0.65709E+00	-0.20000E+01	1	1.89
10	2.65	0.64556E+00	-0.20000E+01	1	1.89
11	2.64	0.63542E+00	-0.20000E+01	1	1.89
12	2.63	0.62632E+00	-0.20000E+01	1	1.90
13	2.62	0.61905E+00	-0.20000E+01	1	1.90
14	2.61	0.61325E+00	-0.20000E+01	1	1.90
15	2.61	0.60987E+00	-0.20000E+01	1	1.91
16	2.61	0.60763E+00	-0.20000E+01	1	1.91
17	2.61	0.60623E+00	-0.20000E+01	1	1.92
18	2.60	0.60468E+00	-0.20000E+01	1	1.92
19	2.60	0.60398E+00	-0.20000E+01	1	1.93
20	2.60	0.60396E+00	-0.20000E+01	1	1.93
21	2.60	0.60478E+00	-0.20000E+01	1	1.94
22	2.60	0.60489E+00	-0.20000E+01	1	1.94
23	2.60	0.60295E+00	-0.20000E+01	1	1.95
24	2.60	0.59924E+00	-0.20000E+01	1	1.95
25	2.59	0.59134E+00	-0.20000E+01	1	1.95
26	2.58	0.58086E+00	-0.20000E+01	1	1.95
27	2.56	0.56270E+00	-0.20000E+01	1	1.96
28	2.49	0.49005E+00	-0.20000E+01	1	1.95

BOUNDARY LAYER CALCULATION AT STRIP 1 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.952

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP -1 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.971

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP 2 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.942

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP -2 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.958

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP 3 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.936

B.L. CALC. TERMINATES AT THIS POINT

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BOUNDARY LAYER CALCULATION AT STRIP  -3 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.987

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP   4 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.929

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  -4 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.990

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP   5 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.928

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  -5 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.997

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP   6 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.944

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  -6 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   7 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.949

B.L. CALC. TERMINATES AT THIS POINT
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BOUNDARY LAYER CALCULATION AT STRIP  -7 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   8 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.957

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  -8 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   9 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.964

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  -9 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  10 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.970

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -10 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  11 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.981

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -11 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  12 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.985

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -12 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  13 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
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SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.987

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -13 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
BOUNDARY LAYER CALCULATION AT STRIP  14 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.985
B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -14 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
BOUNDARY LAYER CALCULATION AT STRIP  15 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.986
B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -15 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
BOUNDARY LAYER CALCULATION AT STRIP  16 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.991
B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -16 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.987
B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  17 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.992

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP -17 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=     0.994
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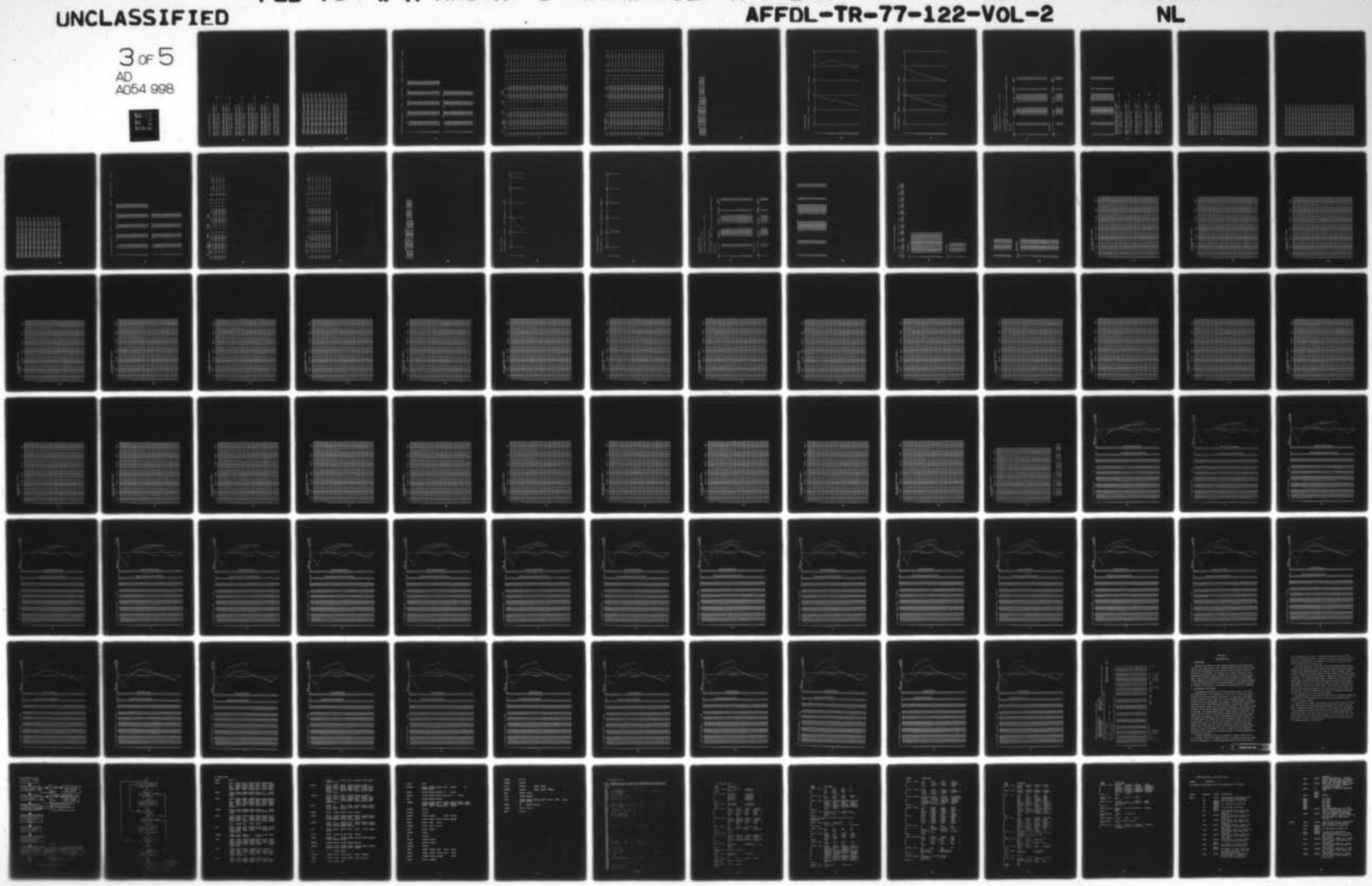
AD-A054 998 GRUMMAN AEROSPACE CORP BETHPAGE N Y F/G 20/4
AN AUTOMATED PROCEDURE FOR COMPUTING THE THREE-DIMENSIONAL TRAN--ETC(U)
FEB 78 W H MASON, D MACKENZIE, M STERN F33615-75-C-3073
UNCLASSIFIED AFFDL-TR-77-122-VOL-2 NL

3 OF 5
AD
A054 998



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B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP  18 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.995

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP -18 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  19 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.996

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -19 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  20 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.979

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -20 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  21 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.987

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -21 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  22 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.997

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP -22 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  23 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
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BOUNDARY LAYER CALCULATION AT STRIP -23 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  24 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -24 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  25 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -25 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  26 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -26 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  27 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -27 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  28 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -28 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
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TOTAL VISCOUS DRAG COEFFICIENT IS 0.790E-02 TOP VISCOUS DRAG IS 0.396E-02 BOTTOM VISCOUS DRAG IS 0.394E-02

K	ETA	UPPER SEP.	LOWER SEP.	SEPU(K)-MOD	SEPU-SMTH
1	0.0	0.9518	0.9706	0.9018	0.9018
2	0.0818	0.9420	0.9583	0.8920	0.8938
3	0.1636	0.9363	0.9870	0.8863	0.8871
4	0.2455	0.9290	0.9901	0.8790	0.8838
5	0.3273	0.9281	0.9967	0.8761	0.8854
6	0.4091	0.9437	1.0000	0.8937	0.8915
7	0.4909	0.9495	1.0000	0.8995	0.8993
8	0.5727	0.9570	1.0000	0.9070	0.9076
9	0.6545	0.9643	0.9988	0.9143	0.9196
10	0.7364	0.9699	0.9984	0.9199	0.9387
11	0.8182	0.9813	0.9983	0.9813	0.9611
12	0.9000	0.9855	1.0000	0.9855	0.9776
13	0.9818	0.9873	1.0000	0.9873	0.9847
14	1.0636	0.9850	0.9998	0.9850	0.9865
15	1.1455	0.9863	1.0000	0.9863	0.9878
16	1.2273	0.9907	0.9870	0.9907	0.9899
17	1.3091	0.9923	0.9942	0.9923	0.9920
18	1.3909	0.9947	1.0000	0.9947	0.9924
19	1.4727	0.9961	1.0000	0.9961	0.9905
20	1.5545	0.9790	1.0000	0.9790	0.9886
21	1.6364	0.9871	1.0000	0.9871	0.9899
22	1.7182	0.9972	1.0000	0.9972	0.9941
23	1.8000	1.0000	1.0000	1.0000	0.9978
24	1.8818	1.0000	1.0000	1.0000	0.9995
25	1.9636	1.0000	1.0000	1.0000	1.0000
26	2.0455	1.0000	1.0000	1.0000	1.0000
27	2.1273	1.0000	1.0000	1.0000	1.0000
28	2.2091	1.0000	1.0000	1.0000	1.0000

K	ETA	LOWER SEP.	SEPL(K)-MOD	SEPL-SMTH
1	0.0	0.9706	0.9206	0.9206
2	0.0818	0.9583	0.9083	0.9083
3	0.1636	0.9870	0.9370	0.9370
4	0.2455	0.9901	0.9401	0.9401
5	0.3273	0.9967	0.9467	0.9467
6	0.4091	1.0000	0.9500	0.9500
7	0.4909	1.0000	0.9500	0.9500
8	0.5727	1.0000	0.9500	0.9500
9	0.6545	0.9988	0.9488	0.9488
10	0.7364	0.9984	0.9484	0.9484
11	0.8182	0.9983	0.9483	0.9483
12	0.9000	1.0000	0.9500	0.9500
13	0.9818	1.0000	0.9500	0.9500
14	1.0636	0.9998	0.9498	0.9498
15	1.1455	1.0000	0.9500	0.9500
16	1.2273	0.9870	0.9370	0.9370
17	1.3091	0.9942	0.9442	0.9442
18	1.3909	1.0000	0.9500	0.9500
19	1.4727	1.0000	0.9500	0.9500
20	1.5545	1.0000	0.9500	0.9500
21	1.6364	1.0000	0.9500	0.9500
22	1.7182	1.0000	0.9500	0.9500
23	1.8000	1.0000	0.9500	0.9500
24	1.8818	1.0000	0.9500	0.9500
25	1.9636	1.0000	0.9500	0.9500
26	2.0455	1.0000	0.9500	0.9500

27 2.1273 1.0000 0.9500 0.9500
28 2.2091 1.0000 0.9500 0.9500

RESIDUAL PARAMETERS

MESH	ITER	ERROR	ERRAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJRSD	KPJ
FINE	124	0.2134E-02	0.7422E-04	52	12	11	0.1794E+02	0.3599E+00	9	29	19	4995	0.1176E+00	0.1752E-02	12
COARSE	125	0.1233E-02	0.8509E-04	17	1	14	0.6708E-01	0.2578E-02	17	1	14	43			
FINE	126	0.1172E-02	0.8085E-04	51	12	11	0.2610E+02	0.5197E+00	9	29	8	4964	0.1164E+00	0.4528E-03	12
COARSE	127	0.1077E-02	0.7645E-04	17	1	14	0.5808E-01	0.2243E-02	16	1	14	43			
FINE	128	0.8284E-03	0.7515E-04	51	13	11	0.1717E+02	0.4566E+00	9	29	8	4944	0.1161E+00	0.5556E-03	13
COARSE	129	0.1009E-02	0.7050E-04	24	1	15	0.5619E-01	0.2048E-02	22	1	15	43			
FINE	130	0.7084E-03	0.7003E-04	58	4	19	0.1666E+02	0.4146E+00	8	29	8	4933	0.1157E+00	0.4469E-03	13
COARSE	131	0.9292E-03	0.6521E-04	23	1	15	0.5321E-01	0.1873E-02	22	1	15	43			
FINE	132	0.6729E-03	0.6462E-04	58	3	19	0.1477E+02	0.3814E+00	11	29	7	4916	0.1153E+00	0.3955E-03	13
COARSE	133	0.8580E-03	0.6073E-04	23	1	15	0.4956E-01	0.1728E-02	21	1	15	43			
FINE	134	0.6458E-03	0.6021E-04	58	3	19	0.1556E+02	0.3631E+00	10	29	7	4910	0.1150E+00	0.3520E-03	13
COARSE	135	0.7843E-03	0.5692E-04	22	1	15	0.4582E-01	0.1609E-02	21	1	15	43			
FINE	136	0.6218E-03	0.5658E-04	58	2	19	0.1637E+02	0.3521E+00	10	29	7	4904	0.1147E+00	0.3157E-03	13
COARSE	137	0.7124E-03	0.5357E-04	22	1	15	0.4168E-01	0.1503E-02	21	1	15	43			
FINE	138	0.6035E-03	0.5345E-04	58	2	19	0.1749E+02	0.3408E+00	8	28	10	4902	0.1144E+00	0.2873E-03	14
COARSE	139	0.6449E-03	0.5062E-04	21	1	15	0.3752E-01	0.1412E-02	20	1	15	43			
FINE	140	0.5922E-03	0.5066E-04	58	1	19	0.1764E+02	0.3287E+00	10	29	15	4901	0.1142E+00	0.2687E-03	14
COARSE	141	0.5820E-03	0.4793E-04	20	1	15	0.3361E-01	0.1332E-02	20	1	15	43			
FINE	142	0.5686E-03	0.4824E-04	58	1	19	0.1898E+02	0.3183E+00	9	29	15	4890	0.1140E+00	0.2520E-03	14
COARSE	143	0.5423E-03	0.4548E-04	24	1	16	0.2986E-01	0.1258E-02	20	1	15	43			
FINE	144	0.5391E-03	0.4613E-04	58	1	19	0.1992E+02	0.3093E+00	9	29	15	4887	0.1138E+00	0.2366E-03	14
COARSE	145	0.5227E-03	0.4323E-04	24	1	16	0.2870E-01	0.1191E-02	23	1	16	43			
FINE	146	0.5043E-03	0.4427E-04	48	28	19	0.2116E+02	0.3009E+00	10	29	18	4889	0.1136E+00	0.2227E-03	14
COARSE	147	0.4955E-03	0.4117E-04	24	1	16	0.2810E-01	0.1130E-02	22	1	16	43			
FINE	148	0.4720E-03	0.4257E-04	51	27	19	0.2210E+02	0.2927E+00	9	29	18	4885	0.1134E+00	0.2105E-03	15
COARSE	149	0.4743E-03	0.3926E-04	23	1	16	0.2729E-01	0.1074E-02	22	1	16	43			
FINE	150	0.4666E-03	0.4099E-04	50	27	19	0.2243E+02	0.2836E+00	9	29	19	4880	0.1132E+00	0.2012E-03	15
COARSE	151	0.4510E-03	0.3748E-04	23	1	16	0.2618E-01	0.1021E-02	22	1	16	43			
FINE	152	0.4583E-03	0.3952E-04	50	27	19	0.2281E+02	0.2738E+00	9	29	19	4877	0.1130E+00	0.1916E-03	15
COARSE	153	0.4237E-03	0.3579E-04	23	1	16	0.2481E-01	0.9731E-03	22	1	16	43			
FINE	154	0.4468E-03	0.3817E-04	49	27	19	0.2273E+02	0.2639E+00	9	29	19	4875	0.1129E+00	0.1816E-03	15
COARSE	155	0.3985E-03	0.3419E-04	22	1	16	0.2337E-01	0.9275E-03	21	1	16	43			
FINE	156	0.4280E-03	0.3694E-04	48	27	19	0.2224E+02	0.2534E+00	9	29	19	4872	0.1127E+00	0.1719E-03	16
COARSE	157	0.3747E-03	0.3271E-04	22	1	16	0.2208E-01	0.8848E-03	21	1	16	43			
FINE	158	0.4031E-03	0.3577E-04	47	27	19	0.2137E+02	0.2425E+00	9	29	19	4867	0.1126E+00	0.1649E-03	16
COARSE	159	0.3495E-03	0.3135E-04	22	1	16	0.2071E-01	0.8449E-03	21	1	16	43			

MESH	RESIDUAL PARAMETERS ITER	ERROR	ERHAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJRSD	KPJ
FINE	160	0.3786E-03	0.3465E-04	47	27	19	0.2020E+02	0.2308E+00	9	29	19	4864	0.1124E+00	0.1575E-03	16
COARSE	161	0.3249E-03	0.3009E-04	21	1	16	0.1930E-01	0.8074E-03	21	1	16	43			
FINE	162	0.3708E-03	0.3356E-04	50	26	19	0.1878E+02	0.2193E+00	9	29	19	4852	0.1123E+00	0.1512E-03	17
COARSE	163	0.3037E-03	0.2890E-04	21	1	16	0.1786E-01	0.7726E-03	21	1	16	43			
FINE	164	0.3622E-03	0.3247E-04	49	26	19	0.1723E+02	0.2073E+00	8	29	19	4835	0.1121E+00	0.1457E-03	17
COARSE	165	0.2825E-03	0.2777E-04	21	1	16	0.1659E-01	0.7397E-03	20	1	16	43			
FINE	166	0.3485E-03	0.3141E-04	48	26	19	0.1558E+02	0.1956E+00	8	29	19	4824	0.1120E+00	0.1396E-03	17
COARSE	167	0.2617E-03	0.2669E-04	21	1	16	0.1544E-01	0.7086E-03	20	1	16	43			
FINE	168	0.3307E-03	0.3036E-04	47	26	19	0.1390E+02	0.1851E+00	8	29	19	4817	0.1119E+00	0.1335E-03	17
COARSE	169	0.2468E-03	0.2566E-04	24	1	17	0.1432E-01	0.6790E-03	20	1	16	43			
FINE	170	0.3143E-03	0.2935E-04	47	26	19	0.1225E+02	0.1758E+00	8	29	19	4807	0.1118E+00	0.1275E-03	17
COARSE	171	0.2400E-03	0.2467E-04	23	1	17	0.1389E-01	0.6510E-03	22	1	17	43			
FINE	172	0.2962E-03	0.2837E-04	46	26	19	0.1067E+02	0.1677E+00	8	29	19	4807	0.1117E+00	0.1216E-03	17
COARSE	173	0.2354E-03	0.2374E-04	23	1	17	0.1372E-01	0.6242E-03	22	1	17	42			
FINE	174	0.2855E-03	0.2740E-04	49	25	19	0.9812E+01	0.1605E+00	10	28	19	4799	0.1116E+00	0.1161E-03	17
COARSE	175	.2293E-03	0.2285E-04	23	1	17	0.1346E-01	0.5989E-03	22	1	17	42			
FINE	176	.2763E-03	0.2647E-04	48	25	19	0.9787E+01	0.1543E+00	10	28	19	4791	0.1115E+00	0.1111E-03	18
COARSE	177	0.2220E-03	0.2199E-04	23	1	17	0.1311E-01	0.5749E-03	22	1	17	41			
FINE	178	0.2642E-03	0.2556E-04	47	25	19	0.9681E+01	0.1487E+00	9	28	19	4784	0.1114E+00	0.1060E-03	18
COARSE	179	0.2136E-03	0.2118E-04	23	1	17	0.1270E-01	0.5520E-03	22	1	17	41			
FINE	180	0.2523E-03	0.2468E-04	47	25	19	0.9527E+01	0.1434E+00	9	28	19	4775	0.1113E+00	0.1013E-03	18
COARSE	181	0.2071E-03	0.2041E-04	22	1	17	0.1229E-01	0.5303E-03	21	1	17	41			
FINE	182	0.2402E-03	0.2383E-04	46	25	19	0.9282E+01	0.1386E+00	9	28	19	4757	0.1112E+00	0.9677E-04	18
COARSE	183	0.2006E-03	0.1969E-04	22	1	17	0.1197E-01	0.5097E-03	21	1	17	41			
FINE	184	0.2268E-03	0.2303E-04	45	25	19	0.8953E+01	0.1340E+00	9	28	19	4751	0.1112E+00	0.9230E-04	18
COARSE	185	0.1934E-03	0.1900E-04	22	1	17	0.1159E-01	0.4905E-03	21	1	17	41			
FINE	186	0.2141E-03	0.2225E-04	45	25	19	0.8547E+01	0.1292E+00	9	28	19	4738	0.1111E+00	0.8763E-04	18
COARSE	187	0.1857E-03	0.1836E-04	22	1	17	0.1118E-01	0.4724E-03	21	1	17	41			
FINE	188	0.2037E-03	0.2152E-04	47	24	19	0.8076E+01	0.1243E+00	9	28	19	4729	0.1110E+00	0.8368E-04	18
COARSE	189	0.1778E-03	0.1776E-04	21	1	17	0.1074E-01	0.4552E-03	21	1	17	41			
FINE	190	0.1949E-03	0.2081E-04	47	24	19	0.7554E+01	0.1193E+00	9	28	19	4715	0.1109E+00	0.7941E-04	18
COARSE	191	0.1717E-03	0.1720E-04	21	1	17	0.1026E-01	0.4388E-03	21	1	17	41			
FINE	192	0.1875E-03	0.2014E-04	46	24	19	0.7004E+01	0.1145E+00	9	28	19	4706	0.1109E+00	0.7543E-04	18

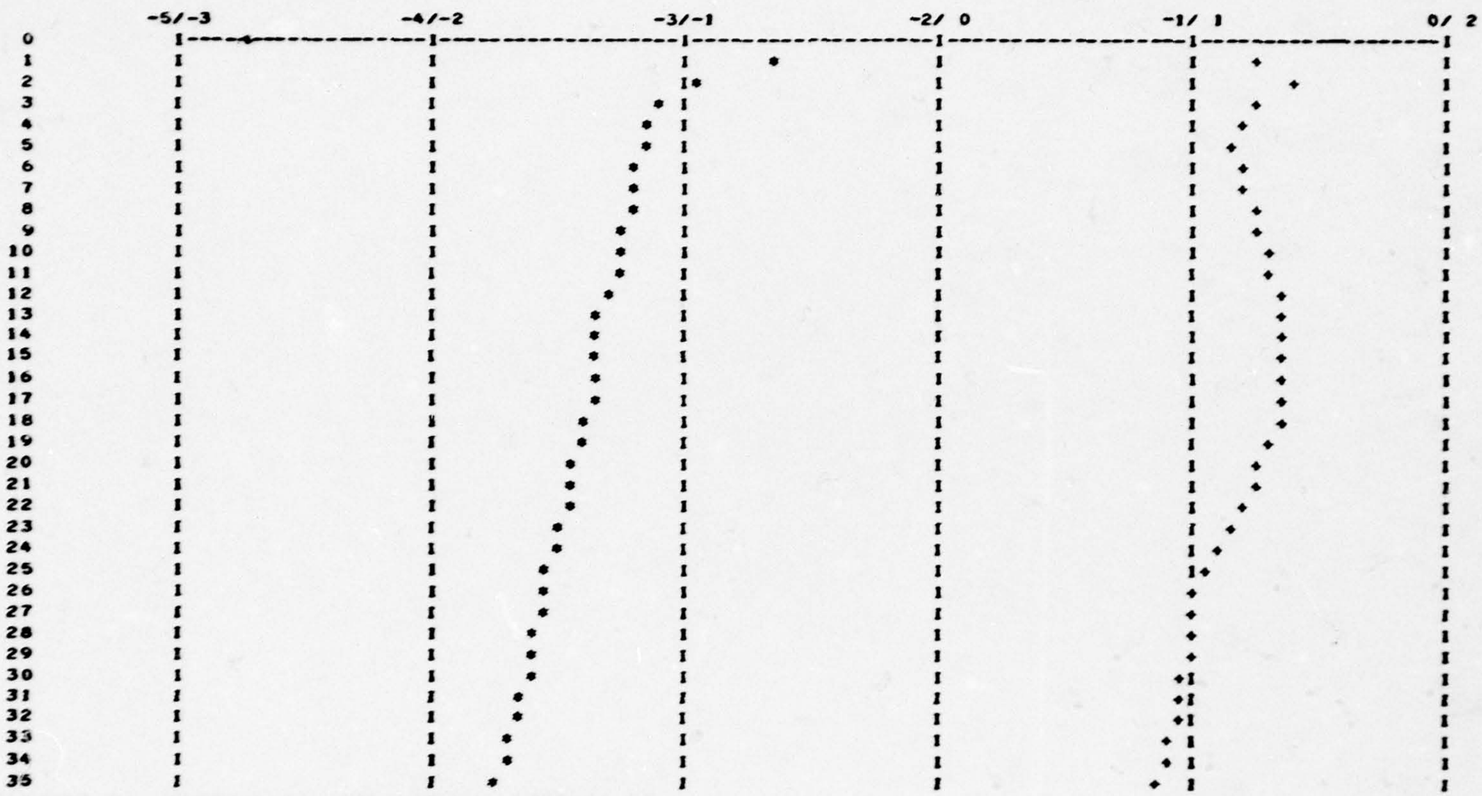
PROBLEM NO. 24-CL EFFECTIVELY CONSTANT. INVISCID SOLUTION HALTS.

PJUMP RESIDUALS , K=1,KTIP-1

0.3890E-04	0.3785E-04	0.3654E-04	0.3477E-04	0.3226E-04	0.2821E-04
0.2259E-04	0.1542E-04	0.7048E-05	-0.2153E-05	-0.1251E-04	-0.2372E-04
-0.3557E-04	-0.4751E-04	-0.5801E-04	-0.6652E-04	-0.7262E-04	-0.7543E-04
-0.7506E-04	-0.7277E-04	-0.6871E-04	-0.6095E-04	-0.5056E-04	-0.4077E-04
-0.3128E-04	-0.2236E-04	-0.1491E-04	-0.8322E-05		

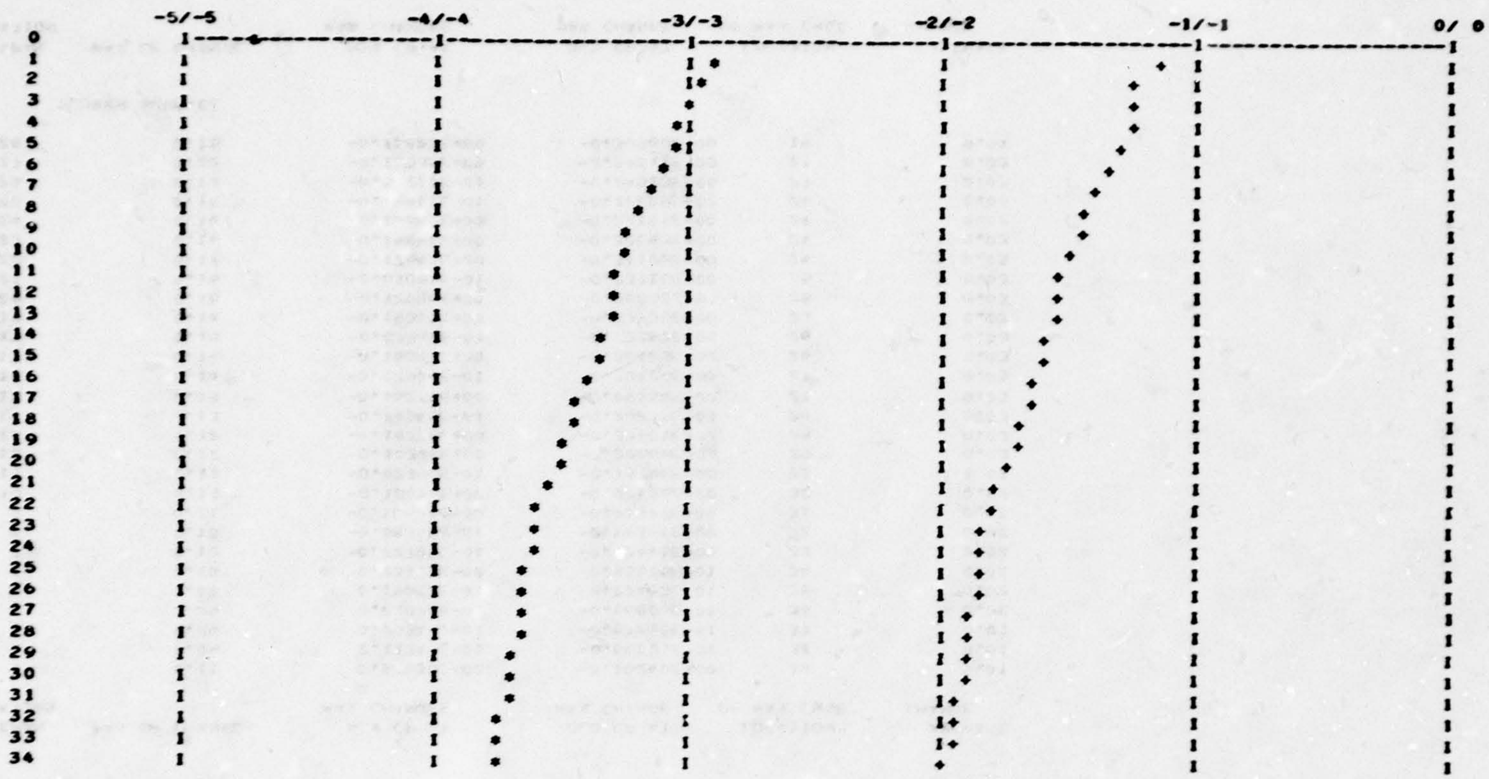
ERPLOT FOR FINE MESH

INITIAL ERROR(*) IS 0.2134E-02 INITIAL RESIDUAL(+) IS 0.1794E+02



ERPLOT FOR COARSE MESH

INITIAL ERROR(*) IS 0.1233E-02 INITIAL RESIDUAL(+) IS 0.6708E-01



VISCOUS FLOW CALCULATION

ITERATION NO.. 2 ON GRID NO. 1

LIFT FROM INTEGRATION OF DELTA PHI AT TE IS 0.11062E+00

TOTAL CHANGE OF PRESSURE SOLUTION

TOP IS 0.3025E+04 BOTTOM IS 0.2117E+04 IN TERMS OF THE CONVERGENCE CRITERION

UPPER SURFACE

SPAN STATION	MAX CP CHANGE	NEW CP AT MAX CHANGES	OLD CP AT MAX CHANGE	LOCATION OF MAX CHGE	AVERAGE CHANGE
1	0.11	0.93530E-02	-0.10240E+00	39	0.01
2	0.09	0.11348E-01	-0.80001E-01	38	0.01
3	0.09	0.20349E-01	-0.67225E-01	37	0.01
4	0.09	0.21072E-01	-0.66805E-01	36	0.02
5	0.09	0.15072E-01	-0.77463E-01	35	0.02
6	0.10	0.23115E-02	-0.95575E-01	34	0.02
7	0.10	-0.22795E-01	-0.12441E+00	33	0.02
8	0.10	-0.58908E-01	-0.16351E+00	32	0.02
9	0.11	-0.10400E+00	-0.21377E+00	31	0.02
10	0.11	-0.16074E+00	-0.27126E+00	30	0.02
11	0.12	-0.42792E-01	-0.15798E+00	30	0.02
12	0.12	-0.10398E+00	-0.22686E+00	29	0.03
13	0.12	-0.18578E+00	-0.30501E+00	28	0.03
14	0.13	-0.74045E-01	-0.20271E+00	28	0.03
15	0.13	-0.16277E+00	-0.29354E+00	27	0.03
16	0.14	-0.67904E-01	-0.20424E+00	27	0.03
17	0.14	-0.16505E+00	-0.30425E+00	26	0.03
18	0.15	-0.83859E-01	-0.23080E+00	26	0.03
19	0.14	-0.19318E+00	-0.33739E+00	25	0.03
20	0.16	-0.12086E+00	-0.28032E+00	25	0.03
21	0.16	-0.81291E-01	-0.23715E+00	25	0.03
22	0.17	-0.17643E+00	-0.34426E+00	24	0.03
23	0.16	-0.14842E+00	-0.30683E+00	24	0.03
24	0.14	-0.13689E+00	-0.27195E+00	24	0.02
25	0.15	-0.79411E-01	-0.22609E+00	24	0.02
26	0.19	-0.52290E-01	-0.24523E+00	23	0.03
27	0.22	-0.12065E+00	-0.34511E+00	21	0.03
28	0.15	-0.15823E+00	-0.30860E+00	19	0.04

LOWER SURFACE

SPAN STATION	MAX CP CHANGE	NEW CP AT MAX CHANGES	OLD CP AT MAX CHANGE	LOCATION OF MAX CHGE	AVERAGE CHANGE
1	0.05	0.52235E-01	-0.31566E-03	39	0.02
2	0.05	-0.76921E-01	-0.12439E+00	34	0.01
3	0.05	-0.78827E-01	-0.12509E+00	33	0.02
4	0.05	-0.82217E-01	-0.12861E+00	32	0.02
5	0.05	-0.87608E-01	-0.13786E+00	31	0.02
6	0.05	-0.95675E-01	-0.14928E+00	30	0.02
7	0.06	-0.10634E+00	-0.16543E+00	29	0.02

8	0.07	-0.11936E+00	-0.18539E+00	28	0.02
9	0.07	-0.13444E+00	-0.20702E+00	27	0.02
10	0.08	-0.15163E+00	-0.23047E+00	26	0.02
11	0.09	0.23235E+00	0.31972E+00	44	0.02
12	0.12	0.19961E+00	0.32081E+00	44	0.02
13	0.13	0.19563E+00	0.32087E+00	44	0.02
14	0.12	0.20396E+00	0.32063E+00	44	0.02
15	0.11	0.20978E+00	0.31951E+00	44	0.02
16	0.10	0.21824E+00	0.31832E+00	44	0.02
17	0.10	0.21975E+00	0.31624E+00	44	0.02
18	0.09	0.22332E+00	0.31375E+00	44	0.02
19	0.09	0.22390E+00	0.31017E+00	44	0.02
20	0.08	0.23069E+00	0.30587E+00	44	0.02
21	0.07	0.23566E+00	0.30141E+00	44	0.02
22	0.06	0.24145E+00	0.29759E+00	44	0.02
23	0.05	0.17075E+00	0.22057E+00	42	0.01
24	0.04	0.17757E+00	0.22151E+00	42	0.01
25	0.04	0.16075E+00	0.20315E+00	41	0.01
26	0.05	-0.22038E+00	-0.27442E+00	22	0.01
27	0.07	-0.25915E+00	-0.32426E+00	20	0.02
28	0.06	0.13777E+00	0.19938E+00	40	0.02

BOUNDARY LAYER CALCULATION AT STRIP 1 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.960

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP -1 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.981

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP 2 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.945

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP -2 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.962

B.L. CALC. TERMINATES AT THIS POINT

BOUNDARY LAYER CALCULATION AT STRIP 3 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE 30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT X/C= 0.943

B.L. CALC. TERMINATES AT THIS POINT

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BOUNDARY LAYER CALCULATION AT STRIP  -3 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   4 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.938

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  -4 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   5 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

SEPARATION DETECTED IN TURBULENT B. L. CALC AT  X/C=      0.985

B.L. CALC. TERMINATES AT THIS POINT


BOUNDARY LAYER CALCULATION AT STRIP  -5 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   6 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  -6 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   7 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  -7 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   8 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  -8 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP   9 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  -9 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  10 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -10 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  11 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -11 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  12 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
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BOUNDARY LAYER CALCULATION AT STRIP -12 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  13 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -13 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  14 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -14 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  15 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -15 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  16 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -16 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  17 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -17 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  18 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -18 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  19 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -19 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  20 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -20 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  21 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -21 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  22 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -22 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  23 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
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BOUNDARY LAYER CALCULATION AT STRIP -23 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  24 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -24 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  25 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -25 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  26 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -26 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  27 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -27 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP  28 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00

BOUNDARY LAYER CALCULATION AT STRIP -28 INITIATED
EFFECTIVE SWEEP ANGLE IS TAKEN TO BE  30.00
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TOTAL VISCOUS DRAG COEFFICIENT IS 0.791E-02 TOP VISCOUS DRAG IS 0.394E-02 BOTTOM VISCOUS DRAG IS 0.397E-02

K	ETA	UPPER SEP.	LOWER SEP.	SEPU(K)-MOD	SEPU-SMTH
1	0.0	0.9599	0.9808	0.9099	0.9099
2	0.0818	0.9450	0.9619	0.8950	0.9021
3	0.1636	0.9429	1.0000	0.8929	0.9047
4	0.2455	0.9384	1.0000	0.8884	0.9252
5	0.3273	0.9848	1.0000	0.9846	0.9574
6	0.4091	1.0000	1.0000	1.0000	0.9843
7	0.4909	1.0000	1.0000	1.0000	0.9968
8	0.5727	1.0000	1.0000	1.0000	0.9998
9	0.6545	1.0000	1.0000	1.0000	1.0000
10	0.7364	1.0000	1.0000	1.0000	1.0000
11	0.8182	1.0000	1.0000	1.0000	1.0000
12	0.9000	1.0000	1.0000	1.0000	1.0000
13	0.9818	1.0000	1.0000	1.0000	1.0000
14	1.0636	1.0000	1.0000	1.0000	1.0000
15	1.1455	1.0000	1.0000	1.0000	1.0000
16	1.2273	1.0000	1.0000	1.0000	1.0000
17	1.3091	1.0000	1.0000	1.0000	1.0000
18	1.3909	1.0000	1.0000	1.0000	1.0000
19	1.4727	1.0000	1.0000	1.0000	1.0000
20	1.5545	1.0000	1.0000	1.0000	1.0000
21	1.6364	1.0000	1.0000	1.0000	1.0000
22	1.7182	1.0000	1.0000	1.0000	1.0000
23	1.8000	1.0000	1.0000	1.0000	1.0000
24	1.8818	1.0000	1.0000	1.0000	1.0000
25	1.9636	1.0000	1.0000	1.0000	1.0000
26	2.0455	1.0000	1.0000	1.0000	1.0000
27	2.1273	1.0000	1.0000	1.0000	1.0000
28	2.2091	1.0000	1.0000	1.0000	1.0000

K	ETA	LOWER SEP.	SEPL(K)-MOD	SEPL-SMTH
1	0.0	0.9808	0.9308	0.9308
2	0.0818	0.9619	0.9119	0.9119
3	0.1636	1.0000	0.9500	0.9500
4	0.2455	1.0000	0.9500	0.9500
5	0.3273	1.0000	0.9500	0.9500
6	0.4091	1.0000	0.9500	0.9500
7	0.4909	1.0000	0.9500	0.9500
8	0.5727	1.0000	0.9500	0.9500
9	0.6545	1.0000	0.9500	0.9500
10	0.7364	1.0000	0.9500	0.9500
11	0.8182	1.0000	0.9500	0.9500
12	0.9000	1.0000	0.9500	0.9500
13	0.9818	1.0000	0.9500	0.9500
14	1.0636	1.0000	0.9500	0.9500
15	1.1455	1.0000	0.9500	0.9500
16	1.2273	1.0000	0.9500	0.9500
17	1.3091	1.0000	0.9500	0.9500
18	1.3909	1.0000	0.9500	0.9500
19	1.4727	1.0000	0.9500	0.9500
20	1.5545	1.0000	0.9500	0.9500
21	1.6364	1.0000	0.9500	0.9500
22	1.7182	1.0000	0.9500	0.9500
23	1.8000	1.0000	0.9500	0.9500
24	1.8818	1.0000	0.9500	0.9500
25	1.9636	1.0000	0.9500	0.9500
26	2.0455	1.0000	0.9500	0.9500

27	2.1273	1.0000	0.9500	0.9500
28	2.2091	1.0000	0.9500	0.9500

RESIDUAL PARAMETERS

MESH	ITER	ERROR	ERRAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJHSD	KPJ
FINE	193	0.1257E-02	0.2842E-04	52	6	11	0.5934E+01	0.1131E+00	9	28	19	4700	0.1108E+00	0.1454E-02	6
COARSE	194	0.3492E-03	0.1944E-04	28	3	10	0.2386E-01	0.5794E-03	20	3	11	41			
FINE	195	0.8063E-03	0.2926E-04	55	6	11	0.6166E+01	0.1353E+00	8	28	19	4692	0.1107E+00	0.3979E-03	6
COARSE	196	0.1755E-03	0.1802E-04	18	3	11	0.1489E-01	0.5024E-03	17	3	11	41			
FINE	197	0.4764E-03	0.2564E-04	51	6	11	0.5656E+01	0.1178E+00	10	27	19	4680	0.1106E+00	0.4328E-03	6
COARSE	198	0.1653E-03	0.1732E-04	18	3	11	0.1374E-01	0.4799E-03	17	3	11	40			
FINE	199	0.3817E-03	0.2438E-04	50	6	11	0.5526E+01	0.1111E+00	10	27	19	4668	0.1105E+00	0.3408E-03	7
COARSE	200	0.1470E-03	0.1662E-04	18	3	11	0.1227E-01	0.4525E-03	18	4	11	40			

RESIDUAL PARAMETERS

MESH	ITER	ERROR	ERRAV	JE	KE	LE	BIGRL	RSDAV	JRD	KRD	LRD	NSUP	LIFT	PJRSD	KPJ
FINE	201	0.3255E-03	0.2315E-04	50	7	11	0.5391E+01	0.1047E+00	9	27	19	4660	0.1104E+00	0.3010E-03	7
COARSE	202	0.1398E-03	0.1600E-04	20	1	17	0.1145E-01	0.4288E-03	18	4	11	40			
FINE	203	0.2854E-03	0.2215E-04	50	7	11	0.5346E+01	0.9988E-01	9	27	19	4658	0.1104E+00	0.2684E-03	7
COARSE	204	0.1343E-03	0.1547E-04	20	1	17	0.1086E-01	0.4093E-03	18	4	11	40			
FINE	205	0.2559E-03	0.2129E-04	49	7	11	0.5236E+01	0.9571E-01	9	27	19	4652	0.1103E+00	0.2398E-03	7
COARSE	206	0.1286E-03	0.1498E-04	20	1	17	0.1043E-01	0.3925E-03	18	4	11	40			
FINE	207	0.2290E-03	0.2052E-04	49	7	11	0.5055E+01	9.9177E-01	9	27	19	4647	0.1102E+00	0.2151E-03	8
COARSE	208	0.1229E-03	0.1454E-04	20	1	17	0.1007E-01	0.3770E-03	18	4	11	40			
FINE	209	0.2053E-03	0.1983E-04	48	7	11	0.4828E+01	0.8808E-01	9	27	19	4641	0.1102E+00	0.1991E-03	8
COARSE	210	0.1196E-03	0.1412E-04	23	1	18	0.9721E-02	0.3628E-03	18	4	11	40			
FINE	211	0.1851E-03	0.1918E-04	48	7	11	0.4588E+01	0.8489E-01	9	27	19	4633	0.1101E+00	0.1830E-03	8
COARSE	212	0.1181E-03	0.1372E-04	22	1	18	0.9328E-02	0.3495E-03	18	4	11	40			
FINE	213	0.1697E-03	0.1856E-04	48	8	11	0.4357E+01	0.8235E-01	9	27	19	4630	0.1101E+00	0.1680E-03	8

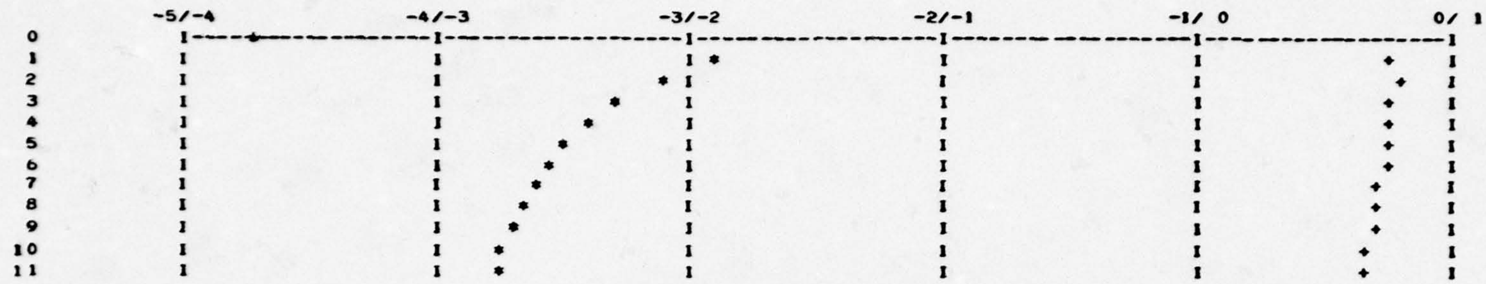
PROBLEM NO. 24-CL EFFECTIVELY CONSTANT. INVISCID SOLUTION HALTS.

PJUMP RESIDUALS , K=1,KTIP-1

0.6966E-05	0.4843E-07	-0.1388E-04	-0.4030E-04	-0.8083E-04	-0.1211E-03
-0.1516E-03	-0.1680E-03	-0.1602E-03	-0.1316E-03	-0.7323E-04	0.1036E-05
0.6647E-04	0.1029E-03	0.1070E-03	0.9447E-04	0.7556E-04	0.5759E-04
0.4210E-04	0.2871E-04	0.1694E-04	0.5644E-05	-0.5126E-05	-0.1388E-04
-0.1870E-04	-0.2093E-04	-0.2206E-04	-0.1885E-04		

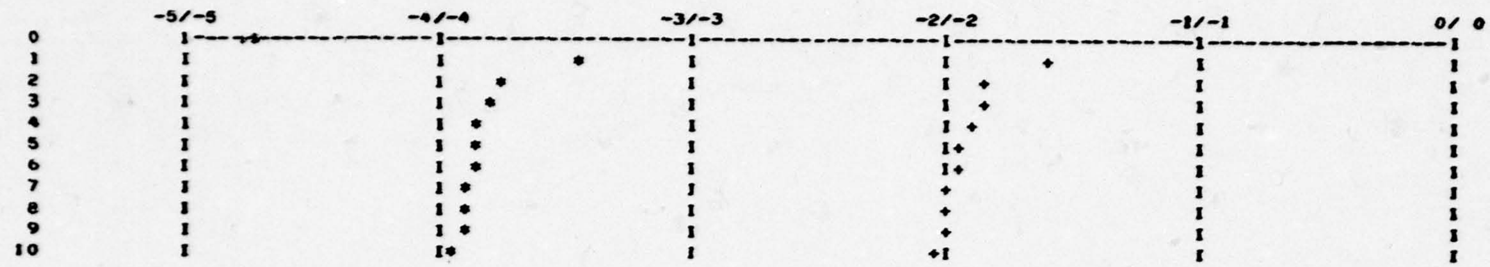
ERPLOT FOR FINE MESH

INITIAL ERROR(*) IS 0.1257E-02 INITIAL RESIDUAL(+) IS 0.5934E+01



ERPLOT FOR COARSE MESH

INITIAL ERROR(*) IS 0.3492E-03 INITIAL RESIDUAL(+) IS 0.2386E-01



VISCOUS FLOW CALCULATION

ITERATION NO.. 3 ON GRID NO. 1

LIFT FROM INTEGRATION OF DELTA PHI AT TE IS 0.11005E+00

TOTAL CHANGE OF PRESSURE SOLUTION

TOP IS 0.1116E+04 BOTTOM IS 0.6977E+03 IN TERMS OF THE CONVERGENCE CRITERION

UPPER SURFACE

SPAN STATION	MAX CP CHANGE	NEW CP AT MAX CHANGES	OLD CP AT MAX CHANGE	LOCATION OF MAX CHGE	AVERAGE CHANGE
1	0.03	-0.13398E+00	-0.16747E+00	38	0.00
2	0.03	-0.10796E+00	-0.13826E+00	37	0.00
3	0.03	-0.90649E-01	-0.11933E+00	36	0.00
4	0.03	-0.89821E-01	-0.11822E+00	35	0.01
5	0.05	0.17768E+00	0.12719E+00	40	0.01
6	0.06	0.18800E+00	0.12977E+00	40	0.01
7	0.06	0.18954E+00	0.13399E+00	40	0.01
8	0.05	0.20303E+00	0.15466E+00	41	0.01
9	0.04	0.20314E+00	0.16428E+00	41	0.01
10	0.04	-0.12321E+00	-0.16074E+00	30	0.01
11	0.05	-0.19184E+00	-0.23752E+00	29	0.01
12	0.06	0.21637E+00	0.27335E+00	42	0.01
13	0.06	0.21366E+00	0.27763E+00	42	0.01
14	0.06	-0.23292E+00	-0.29515E+00	27	0.01
15	0.06	-0.35167E+00	-0.41171E+00	26	0.01
16	0.08	-0.21018E+00	-0.28629E+00	26	0.01
17	0.07	-0.34252E+00	-0.41634E+00	25	0.01
18	0.09	-0.21113E+00	-0.29946E+00	25	0.01
19	0.08	-0.35082E+00	-0.43283E+00	24	0.01
20	0.10	-0.23630E+00	-0.33448E+00	24	0.01
21	0.09	-0.15155E+00	-0.24422E+00	24	0.01
22	0.10	-0.28664E+00	-0.38535E+00	23	0.01
23	0.08	-0.23662E+00	-0.31850E+00	23	0.01
24	0.07	-0.21308E+00	-0.28337E+00	23	0.01
25	0.09	-0.33703E+00	-0.42710E+00	22	0.01
26	0.10	-0.37213E+00	-0.47438E+00	21	0.01
27	0.08	-0.24759E+00	-0.32288E+00	20	0.01
28	0.03	-0.33798E+00	-0.36837E+00	17	0.01

LOWER SURFACE

SPAN STATION	MAX CP CHANGE	NEW CP AT MAX CHANGES	OLD CP AT MAX CHANGE	LOCATION OF MAX CHGE	AVERAGE CHANGE
1	0.02	-0.15237E+00	-0.17179E+00	34	0.00
2	0.02	-0.14860E+00	-0.16682E+00	33	0.00
3	0.02	-0.14460E+00	-0.16326E+00	32	0.00
4	0.02	0.24252E+00	0.26256E+00	44	0.00
5	0.02	0.23335E+00	0.25775E+00	44	0.00
6	0.03	0.22445E+00	0.25820E+00	44	0.00
7	0.03	0.22802E+00	0.25804E+00	44	0.01

8	0.03	0.23247E+00	0.25844E+00	44	0.01
9	0.03	-0.20073E+00	-0.22591E+00	26	0.01
10	0.03	-0.21973E+00	-0.24589E+00	25	0.01
11	0.03	-0.24120E+00	-0.26798E+00	24	0.01
12	0.03	0.22945E+00	0.19961E+00	44	0.01
13	0.03	0.22994E+00	0.19563E+00	44	0.01
14	0.03	0.23323E+00	0.20396E+00	44	0.01
15	0.02	0.23420E+00	0.20978E+00	44	0.01
16	0.02	-0.29408E+00	-0.31584E+00	20	0.01
17	0.02	-0.31965E+00	-0.33795E+00	19	0.01
18	0.02	0.23864E+00	0.22332E+00	44	0.01
19	0.02	-0.13199E+00	-0.11591E+00	27	0.01
20	0.02	-0.15581E+00	-0.13788E+00	26	0.01
21	0.02	-0.17929E+00	-0.16062E+00	25	0.01
22	0.02	-0.20236E+00	-0.18620E+00	24	0.01
23	0.01	-0.22492E+00	-0.21515E+00	23	0.00
24	0.01	-0.20390E+00	-0.19179E+00	24	0.00
25	0.02	-0.22905E+00	-0.20706E+00	23	0.01
26	0.03	-0.24738E+00	-0.22038E+00	22	0.01
27	0.02	-0.28190E+00	-0.25915E+00	20	0.01
28	0.01	0.23569E+00	0.24983E+00	44	0.01

VISCOUS-INVISCID ITERATION HAS CONVERGED

J	CLGG	ITER	EPS1X	EPS2X	CPUK1	CPLK1	CPUK2	CPLK2	DELUK1	DELLK1	DELUK2	DELLK2
1	0.118	12	0.0	0.0	0.29584	0.29497	0.27332	0.26962	0.01136	0.00775	0.00647	0.00567
2	0.111	35	30.25356	21.16974	0.26900	0.26741	0.27438	0.26822	0.01043	0.00648	0.00638	0.00559
3	0.110	11	11.15963	6.97683	0.25743	0.25732	0.26607	0.25737	0.01043	0.00648	0.00638	0.00559

PJUMP HISTORY

IVITER / K	1	2	3
1	0.5349E-01	0.5458E-01	0.5439E-01
2	0.5353E-01	0.5444E-01	0.5414E-01
3	0.5360E-01	0.5449E-01	0.5435E-01
4	0.5356E-01	0.5437E-01	0.5326E-01
5	0.5350E-01	0.5459E-01	0.5188E-01
6	0.5337E-01	0.5447E-01	0.5054E-01
7	0.5314E-01	0.5403E-01	0.5016E-01
8	0.5283E-01	0.5340E-01	0.4984E-01
9	0.5238E-01	0.5211E-01	0.4931E-01
10	0.5187E-01	0.5083E-01	0.4836E-01
11	0.5127E-01	0.4798E-01	0.4731E-01
12	0.5059E-01	0.4422E-01	0.4618E-01
13	0.4984E-01	0.4246E-01	0.4504E-01
14	0.4900E-01	0.4173E-01	0.4408E-01
15	0.4808E-01	0.4101E-01	0.4304E-01
16	0.4706E-01	0.4016E-01	0.4201E-01
17	0.4595E-01	0.3962E-01	0.4099E-01
18	0.4472E-01	0.3889E-01	0.3994E-01
19	0.4338E-01	0.3782E-01	0.3872E-01
20	0.4189E-01	0.3695E-01	0.3756E-01
21	0.4019E-01	0.3584E-01	0.3624E-01
22	0.3821E-01	0.3455E-01	0.3475E-01
23	0.3586E-01	0.3299E-01	0.3296E-01
24	0.3311E-01	0.3099E-01	0.3080E-01
25	0.2989E-01	0.2825E-01	0.2803E-01
26	0.2602E-01	0.2490E-01	0.2461E-01
27	0.2116E-01	0.2058E-01	0.2023E-01
28	0.1432E-01	0.1428E-01	0.1392E-01

XSEP UPPER

IVITER / K	1	2
1	0.9518	0.9599
2	0.9420	0.9450
3	0.9363	0.9429
4	0.9290	0.9384
5	0.9281	0.9848
6	0.9437	1.0000
7	0.9495	1.0000
8	0.9570	1.0000
9	0.9643	1.0000
10	0.9699	1.0000
11	0.9813	1.0000
12	0.9855	1.0000
13	0.9873	1.0000
14	0.9850	1.0000
15	0.9863	1.0000

16	0.9907	1.0000
17	0.9923	1.0000
18	0.9947	1.0000
19	0.9961	1.0000
20	0.9790	1.0000
21	0.9871	1.0000
22	0.9972	1.0000
23	1.0000	1.0000
24	1.0000	1.0000
25	1.0000	1.0000
26	1.0000	1.0000
27	1.0000	1.0000
28	1.0000	1.0000

	XSEP LOWER	
IVITER	1	2
K		
1	0.9706	0.9808
2	0.9583	0.9619
3	0.9870	1.0000
4	0.9901	1.0000
5	0.9967	1.0000
6	1.0000	1.0000
7	1.0000	1.0000
8	1.0000	1.0000
9	0.9988	1.0000
10	0.9984	1.0000
11	0.9983	1.0000
12	1.0000	1.0000
13	1.0000	1.0000
14	0.9998	1.0000
15	1.0000	1.0000
16	0.9870	1.0000
17	0.9942	1.0000
18	1.0000	1.0000
19	1.0000	1.0000
20	1.0000	1.0000
21	1.0000	1.0000
22	1.0000	1.0000
23	1.0000	1.0000
24	1.0000	1.0000
25	1.0000	1.0000
26	1.0000	1.0000
27	1.0000	1.0000
28	1.0000	1.0000

NEW DISPLACEMENT THICKNESS
AT STATION 1

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3598E-04	-0.1711E-03	0.3712E-04	-0.1798E-03	-0.4798E+02	-0.4994E+02
2	0.012	0.3812E-04	0.5752E-03	0.3926E-04	0.5881E-03	-0.2676E+02	-0.2873E+02
3	0.020	0.4451E-04	0.4440E-03	0.4580E-04	0.4486E-03	-0.2011E+02	-0.2208E+02
4	0.028	0.5069E-04	0.7358E-03	0.5209E-04	0.7493E-03	-0.1644E+02	-0.1840E+02
5	0.037	0.5867E-04	0.7839E-03	0.6021E-04	0.7982E-03	-0.1396E+02	-0.1592E+02
6	0.046	0.6635E-04	0.5764E-03	0.6800E-04	0.5804E-03	-0.1207E+02	-0.1403E+02
7	0.056	0.7303E-04	0.1093E-02	0.7410E-04	0.1038E-02	-0.1057E+02	-0.1253E+02
8	0.067	0.1011E-03	0.2097E-02	0.1037E-03	0.2205E-02	-0.9314E+01	-0.1128E+02
9	0.080	0.1251E-03	0.1415E-02	0.1281E-03	0.1425E-02	-0.8082E+01	-0.1004E+02
10	0.095	0.1509E-03	0.1538E-02	0.1506E-03	0.1185E-02	-0.6982E+01	-0.8924E+01
11	0.112	0.1748E-03	0.1457E-02	0.1775E-03	0.1481E-02	-0.5917E+01	-0.7680E+01
12	0.133	0.2100E-03	0.7993E-03	0.2087E-03	0.5855E-03	-0.4860E+01	-0.6809E+01
13	0.156	0.2520E-03	0.1263E-02	0.2488E-03	0.1141E-02	-0.3895E+01	-0.5849E+01
14	0.183	0.3007E-03	0.1438E-02	0.2970E-03	0.1337E-02	-0.2957E+01	-0.4913E+01
15	0.212	0.3577E-03	0.1639E-02	0.3524E-03	0.1569E-02	-0.2061E+01	-0.4018E+01
16	0.242	0.4173E-03	0.1689E-02	0.4113E-03	0.1671E-02	-0.1201E+01	-0.3161E+01
17	0.272	0.4767E-03	0.1705E-02	0.4694E-03	0.1653E-02	-0.3512E+00	-0.2309E+01
18	0.301	0.5348E-03	0.1621E-02	0.5269E-03	0.1633E-02	0.6273E+00	-0.1334E+01
19	0.330	0.5901E-03	0.1559E-02	0.5821E-03	0.1589E-02	0.1486E+01	-0.4770E+00
20	0.359	0.6440E-03	0.1589E-02	0.6357E-03	0.1539E-02	0.2135E+01	0.1765E+00
21	0.387	0.6982E-03	0.1656E-02	0.6892E-03	0.1595E-02	0.2658E+01	0.7003E+00
22	0.415	0.7535E-03	0.1711E-02	0.7447E-03	0.1696E-02	0.3111E+01	0.1151E+01
23	0.443	0.8093E-03	0.1715E-02	0.8007E-03	0.1706E-02	0.3515E+01	0.1554E+01
24	0.471	0.8657E-03	0.1729E-02	0.8575E-03	0.1719E-02	0.3856E+01	0.1896E+01
25	0.499	0.9213E-03	0.1707E-02	0.9142E-03	0.1673E-02	0.4166E+01	0.2207E+01
26	0.527	0.9786E-03	0.1665E-02	0.9723E-03	0.1696E-02	0.4435E+01	0.2473E+01
27	0.556	0.1037E-02	0.1677E-02	0.1033E-02	0.1741E-02	0.4674E+01	0.2709E+01
28	0.585	0.1098E-02	0.1733E-02	0.1098E-02	0.1930E-02	0.4869E+01	0.2897E+01
29	0.614	0.1160E-02	0.1787E-02	0.1171E-02	0.2311E-02	0.5035E+01	0.3045E+01
30	0.644	0.1224E-02	0.1874E-02	0.1256E-02	0.2892E-02	0.5166E+01	0.3148E+01
31	0.674	0.1291E-02	0.1968E-02	0.1357E-02	0.2979E-02	0.5264E+01	0.3246E+01
32	0.704	0.1368E-02	0.2080E-02	0.1485E-02	0.3689E-02	0.5333E+01	0.3282E+01
33	0.734	0.1452E-02	0.2619E-02	0.1642E-02	0.4718E-02	0.5346E+01	0.3267E+01
34	0.763	0.1559E-02	0.3455E-02	0.1635E-02	0.5735E-02	0.5309E+01	0.3219E+01
35	0.793	0.1699E-02	0.4695E-02	0.2064E-02	0.6843E-02	0.5239E+01	0.3157E+01
36	0.821	0.1887E-02	0.6531E-02	0.2325E-02	0.7959E-02	0.5134E+01	0.3093E+01
37	0.848	0.2141E-02	0.9432E-02	0.2612E-02	0.9316E-02	0.4973E+01	0.3018E+01
38	0.874	0.2479E-02	0.1331E-01	0.2926E-02	0.1114E-01	0.4755E+01	0.2915E+01
39	0.897	0.2927E-02	0.1938E-01	0.3274E-02	0.1398E-01	0.4412E+01	0.2754E+01
40	0.919	0.3548E-02	0.2961E-01	0.3675E-02	0.1846E-01	0.4412E+01	0.2476E+01
41	0.940	0.4461E-02	0.5043E-01	0.4157E-02	0.2366E-01	0.4412E+01	0.2476E+01
42	0.960	0.6239E-02	0.1096E+00	0.4785E-02	0.3624E-01	0.4412E+01	0.2476E+01
43	0.980	0.9003E-02	0.1096E+00	0.5685E-02	0.5328E-01	0.4412E+01	0.2476E+01
44	1.000	0.1177E-01	0.1096E+00	0.6798E-02	0.5371E-01	0.4412E+01	0.2476E+01

NEW DISPLACEMENT THICKNESS
AT STATION 2

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3365E-04	-0.1493E-03	0.3549E-04	-0.1664E-03	-0.4798E+02	-0.4994E+02
2	0.012	0.3585E-04	0.5535E-03	0.3766E-04	0.5723E-03	-0.2676E+02	-0.2872E+02
3	0.020	0.4196E-04	0.4380E-03	0.4402E-04	0.4484E-03	-0.2011E+02	-0.2208E+02
4	0.028	0.4793E-04	0.7067E-03	0.5023E-04	0.7391E-03	-0.1644E+02	-0.1840E+02
5	0.037	0.5564E-04	0.7672E-03	0.5822E-04	0.7822E-03	-0.1396E+02	-0.1592E+02
6	0.046	0.6342E-04	0.6194E-03	0.6583E-04	0.5652E-03	-0.1207E+02	-0.1403E+02
7	0.056	0.6945E-04	0.8573E-03	0.7306E-04	0.1178E-02	-0.1056E+02	-0.1254E+02
8	0.067	0.9704E-04	0.2464E-02	0.1012E-03	0.2329E-02	-0.9334E+01	-0.1129E+02
9	0.080	0.1236E-03	0.1168E-02	0.1267E-03	0.1198E-02	-0.8068E+01	-0.1003E+02
10	0.095	0.1529E-03	0.2007E-02	0.1551E-03	0.1898E-02	-0.7009E+01	-0.8964E+01
11	0.112	0.1794E-03	0.1451E-02	0.1789E-03	0.1393E-02	-0.5917E+01	-0.7875E+01
12	0.133	0.2191E-03	0.1132E-02	0.2172E-03	0.1057E-02	-0.4879E+01	-0.6836E+01
13	0.156	0.2643E-03	0.1216E-02	0.2611E-03	0.1234E-02	-0.3892E+01	-0.5854E+01
14	0.183	0.3166E-03	0.1481E-02	0.3113E-03	0.1434E-02	-0.2960E+01	-0.4918E+01
15	0.212	0.3751E-03	0.1620E-02	0.3691E-03	0.1631E-02	-0.2059E+01	-0.4021E+01
16	0.242	0.4351E-03	0.1747E-02	0.4285E-03	0.1692E-02	-0.1204E+01	-0.3162E+01
17	0.272	0.4958E-03	0.1716E-02	0.4686E-03	0.1712E-02	-0.3517E+00	-0.2313E+01
18	0.301	0.5542E-03	0.1568E-02	0.5468E-03	0.1651E-02	0.6302E+00	-0.1335E+01
19	0.330	0.6087E-03	0.1598E-02	0.6024E-03	0.1557E-02	0.1483E+01	-0.4752E+00
20	0.359	0.6640E-03	0.1613E-02	0.6574E-03	0.1595E-02	0.2133E+01	0.1734E+00
21	0.387	0.7197E-03	0.1681E-02	0.7135E-03	0.1671E-02	0.2656E+01	0.6961E+00
22	0.415	0.7755E-03	0.1635E-02	0.7701E-03	0.1723E-02	0.3116E+01	0.1150E+01
23	0.443	0.8321E-03	0.1646E-02	0.8265E-03	0.1778E-02	0.3519E+01	0.1550E+01
24	0.471	0.8880E-03	0.1748E-02	0.8854E-03	0.1747E-02	0.3855E+01	0.1594E+01
25	0.499	0.9451E-03	0.1726E-02	0.9441E-03	0.1779E-02	0.4165E+01	0.2201E+01
26	0.527	0.1004E-02	0.1722E-02	0.1005E-02	0.1820E-02	0.4432E+01	0.2466E+01
27	0.556	0.1063E-02	0.1707E-02	0.1071E-02	0.1915E-02	0.4672E+01	0.2700E+01
28	0.585	0.1124E-02	0.1736E-02	0.1144E-02	0.2169E-02	0.4868E+01	0.2883E+01
29	0.614	0.1187E-02	0.1830E-02	0.1229E-02	0.2777E-02	0.5033E+01	0.3018E+01
30	0.644	0.1255E-02	0.1950E-02	0.1330E-02	0.3375E-02	0.5162E+01	0.3121E+01
31	0.674	0.1326E-02	0.2085E-02	0.1458E-02	0.3986E-02	0.5257E+01	0.3189E+01
32	0.704	0.1411E-02	0.2531E-02	0.1616E-02	0.4721E-02	0.5308E+01	0.3224E+01
33	0.734	0.1517E-02	0.3392E-02	0.1806E-02	0.5522E-02	0.5302E+01	0.3222E+01
34	0.763	0.1658E-02	0.4561E-02	0.2030E-02	0.6516E-02	0.5246E+01	0.3176E+01
35	0.793	0.1848E-02	0.6478E-02	0.2285E-02	0.7402E-02	0.5139E+01	0.3126E+01
36	0.821	0.2108E-02	0.9290E-02	0.2559E-02	0.8264E-02	0.4979E+01	0.3076E+01
37	0.848	0.2445E-02	0.1229E-01	0.2850E-02	0.9439E-02	0.4813E+01	0.3012E+01
38	0.874	0.2891E-02	0.1718E-01	0.3161E-02	0.1127E-01	0.4537E+01	0.2908E+01
39	0.897	0.3472E-02	0.2435E-01	0.3504E-02	0.1424E-01	0.4371E+01	0.2788E+01
40	0.919	0.4240E-02	0.3590E-01	0.3900E-02	0.1885E-01	0.4371E+01	0.2788E+01
41	0.940	0.5395E-02	0.6667E-01	0.4383E-02	0.2517E-01	0.4371E+01	0.2788E+01
42	0.960	0.7074E-02	0.7459E-01	0.5002E-02	0.3550E-01	0.4371E+01	0.2788E+01
43	0.980	0.8755E-02	0.7459E-01	0.5739E-02	0.3610E-01	0.4371E+01	0.2788E+01
44	1.000	0.1043E-01	0.7459E-01	0.6477E-02	0.3610E-01	0.4371E+01	0.2788E+01

NEW DISPLACEMENT THICKNESS
AT STATION 3

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3142E-04	-0.1100E-03	0.3519E-04	-0.1627E-03	-0.4798E+02	-0.4994E+02
2	0.012	0.3390E-04	0.5833E-03	0.3739E-04	0.5715E-03	-0.2676E+02	-0.2872E+02
3	0.020	0.4055E-04	0.5360E-03	0.4374E-04	0.4539E-03	-0.2012E+02	-0.2208E+02
4	0.028	0.4783E-04	0.8736E-03	0.5001E-04	0.7444E-03	-0.1645E+02	-0.1840E+02
5	0.037	0.5756E-04	0.9762E-03	0.5803E-04	0.7827E-03	-0.1397E+02	-0.1592E+02
6	0.046	0.6744E-04	0.7561E-03	0.6559E-04	0.5543E-03	-0.1208E+02	-0.1403E+02
7	0.056	0.7246E-04	0.5981E-03	0.7197E-04	0.1113E-02	-0.1055E+02	-0.1254E+02
8	0.067	0.9947E-04	0.2450E-02	0.1027E-03	0.2480E-02	-0.9333E+01	-0.1130E+02
9	0.080	0.1260E-03	0.1295E-02	0.1274E-03	0.1082E-02	-0.8075E+01	-0.1002E+02
10	0.095	0.1556E-03	0.1994E-02	0.1551E-03	0.1831E-02	-0.7008E+01	-0.8960E+01
11	0.112	0.1845E-03	0.1468E-02	0.1805E-03	0.1411E-02	-0.5918E+01	-0.7876E+01
12	0.133	0.2246E-03	0.1364E-02	0.2193E-03	0.1092E-02	-0.4892E+01	-0.6838E+01
13	0.156	0.2708E-03	0.1458E-02	0.2643E-03	0.1287E-02	-0.3906E+01	-0.5857E+01
14	0.183	0.3244E-03	0.1576E-02	0.3159E-03	0.1473E-02	-0.2965E+01	-0.4920E+01
15	0.212	0.3842E-03	0.1727E-02	0.3748E-03	0.1695E-02	-0.2065E+01	-0.4025E+01
16	0.242	0.4457E-03	0.1766E-02	0.4357E-03	0.1775E-02	-0.1205E+01	-0.3166E+01
17	0.272	0.5076E-03	0.1727E-02	0.4974E-03	0.1747E-02	-0.3524E+00	-0.2315E+01
18	0.301	0.5677E-03	0.1655E-02	0.5576E-03	0.1703E-02	0.6254E+00	-0.1338E+01
19	0.330	0.6242E-03	0.1598E-02	0.6150E-03	0.1643E-02	0.1483E+01	-0.4801E+00
20	0.359	0.6805E-03	0.1675E-02	0.6722E-03	0.1641E-02	0.2130E+01	0.1708E+00
21	0.387	0.7379E-03	0.1697E-02	0.7304E-03	0.1752E-02	0.2656E+01	0.6915E+00
22	0.415	0.7955E-03	0.1785E-02	0.7891E-03	0.1805E-02	0.3107E+01	0.1145E+01
23	0.443	0.8534E-03	0.1927E-02	0.8489E-03	0.1957E-02	0.3503E+01	0.1540E+01
24	0.471	0.9122E-03	0.1761E-02	0.9089E-03	0.1891E-02	0.3855E+01	0.1886E+01
25	0.499	0.9709E-03	0.1762E-02	0.9717E-03	0.1958E-02	0.4163E+01	0.2191E+01
26	0.527	0.1030E-02	0.1765E-02	0.1039E-02	0.2033E-02	0.4430E+01	0.2454E+01
27	0.556	0.1092E-02	0.1770E-02	0.1113E-02	0.2130E-02	0.4669E+01	0.2687E+01
28	0.585	0.1155E-02	0.1830E-02	0.1199E-02	0.2501E-02	0.4863E+01	0.2865E+01
29	0.614	0.1222E-02	0.2069E-02	0.1302E-02	0.3241E-02	0.5019E+01	0.2992E+01
30	0.644	0.1296E-02	0.2204E-02	0.1430E-02	0.3972E-02	0.5148E+01	0.3067E+01
31	0.674	0.1384E-02	0.2594E-02	0.1586E-02	0.4821E-02	0.5228E+01	0.3142E+01
32	0.704	0.1490E-02	0.3295E-02	0.1776E-02	0.5553E-02	0.5265E+01	0.3177E+01
33	0.734	0.1631E-02	0.4399E-02	0.1997E-02	0.6383E-02	0.5246E+01	0.3173E+01
34	0.763	0.1822E-02	0.6007E-02	0.2245E-02	0.6980E-02	0.5165E+01	0.3149E+01
35	0.793	0.2080E-02	0.8505E-02	0.2507E-02	0.7367E-02	0.5025E+01	0.3128E+01
36	0.821	0.2423E-02	0.1158E-01	0.2778E-02	0.8339E-02	0.4850E+01	0.3071E+01
37	0.848	0.2863E-02	0.1534E-01	0.3055E-02	0.9035E-02	0.4641E+01	0.3034E+01
38	0.874	0.3410E-02	0.2043E-01	0.3343E-02	0.1051E-01	0.4355E+01	0.2951E+01
39	0.897	0.4076E-02	0.2733E-01	0.3653E-02	0.1296E-01	0.4345E+01	0.2823E+01
40	0.919	0.4896E-02	0.3897E-01	0.4003E-02	0.1668E-01	0.4345E+01	0.2576E+01
41	0.940	0.6015E-02	0.6268E-01	0.4416E-02	0.2197E-01	0.4345E+01	0.2184E+01
42	0.960	0.7439E-02	0.6505E-01	0.4928E-02	0.3024E-01	0.4345E+01	0.2184E+01
43	0.980	0.8849E-02	0.6505E-01	0.5591E-02	0.4768E-01	0.4345E+01	0.2184E+01
44	1.000	0.1026E-01	0.6505E-01	0.6508E-02	0.6641E-01	0.4345E+01	0.2184E+01

NEW DISPLACEMENT THICKNESS
AT STATION 4

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3058E-04	-0.9228E-04	0.3503E-04	-0.1590E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3323E-04	0.5998E-03	0.3727E-04	0.5727E-03	-0.2676E+02	-0.2872E+02
3	0.020	0.4014E-04	0.5846E-03	0.4362E-04	0.4558E-03	-0.2012E+02	-0.2208E+02
4	0.028	0.4805E-04	0.9578E-03	0.4987E-04	0.7420E-03	-0.1645E+02	-0.1840E+02
5	0.037	0.5860E-04	0.1088E-02	0.5789E-04	0.7882E-03	-0.1398E+02	-0.1592E+02
6	0.046	0.6981E-04	0.8335E-03	0.6565E-04	0.5842E-03	-0.1209E+02	-0.1403E+02
7	0.056	0.7332E-04	0.3311E-03	0.7126E-04	0.9099E-03	-0.1053E+02	-0.1252E+02
8	0.067	0.1010E-03	0.2608E-02	0.1010E-03	0.2564E-02	-0.9342E+01	-0.1130E+02
9	0.080	0.1287E-03	0.1260E-02	0.1270E-03	0.1088E-02	-0.8073E+01	-0.1002E+02
10	0.095	0.1585E-03	0.1984E-02	0.1549E-03	0.1896E-02	-0.7007E+01	-0.8963E+01
11	0.112	0.1875E-03	0.1511E-02	0.1812E-03	0.1444E-02	-0.5920E+01	-0.7877E+01
12	0.133	0.2280E-03	0.1307E-02	0.2208E-03	0.1147E-02	-0.4889E+01	-0.6841E+01
13	0.156	0.2761E-03	0.1283E-02	0.2664E-03	0.1261E-02	-0.3896E+01	-0.5856E+01
14	0.183	0.3302E-03	0.1555E-02	0.3187E-03	0.1475E-02	-0.2964E+01	-0.4920E+01
15	0.212	0.3910E-03	0.1725E-02	0.3783E-03	0.1714E-02	-0.2065E+01	-0.4026E+01
16	0.242	0.4531E-03	0.1784E-02	0.4404E-03	0.1804E-02	-0.1206E+01	-0.3168E+01
17	0.272	0.5161E-03	0.1809E-02	0.5036E-03	0.1797E-02	-0.3570E+00	-0.2317E+01
18	0.301	0.5779E-03	0.1764E-02	0.5652E-03	0.1762E-02	0.6192E+00	-0.1342E+01
19	0.330	0.6380E-03	0.1699E-02	0.6236E-03	0.1661E-02	0.1478E+01	-0.4611E+00
20	0.359	0.6966E-03	0.1719E-02	0.6824E-03	0.1725E-02	0.2127E+01	0.1661E+00
21	0.387	0.7555E-03	0.1768E-02	0.7424E-03	0.1795E-02	0.2652E+01	0.6891E+00
22	0.415	0.8149E-03	0.1839E-02	0.8034E-03	0.1863E-02	0.3104E+01	0.1142E+01
23	0.443	0.8732E-03	0.1785E-02	0.8662E-03	0.1986E-02	0.3511E+01	0.1539E+01
24	0.471	0.9338E-03	0.1788E-02	0.9297E-03	0.2098E-02	0.3853E+01	0.1875E+01
25	0.499	0.9941E-03	0.1813E-02	0.9986E-03	0.2167E-02	0.4160E+01	0.2180E+01
26	0.527	0.1056E-02	0.1797E-02	0.1075E-02	0.2178E-02	0.4428E+01	0.2445E+01
27	0.556	0.1119E-02	0.1832E-02	0.1161E-02	0.2409E-02	0.4665E+01	0.2672E+01
28	0.585	0.1187E-02	0.1973E-02	0.1263E-02	0.3132E-02	0.4855E+01	0.2829E+01
29	0.614	0.1261E-02	0.2371E-02	0.1388E-02	0.3744E-02	0.5002E+01	0.2964E+01
30	0.644	0.1348E-02	0.2738E-02	0.1543E-02	0.4676E-02	0.5118E+01	0.3048E+01
31	0.674	0.1461E-02	0.3330E-02	0.1729E-02	0.5502E-02	0.5187E+01	0.3104E+01
32	0.704	0.1601E-02	0.4024E-02	0.1944E-02	0.6247E-02	0.5224E+01	0.3138E+01
33	0.734	0.1786E-02	0.5466E-02	0.2183E-02	0.6711E-02	0.5186E+01	0.3155E+01
34	0.763	0.2039E-02	0.7926E-02	0.2430E-02	0.6818E-02	0.5057E+01	0.3159E+01
35	0.793	0.2379E-02	0.1079E-01	0.2680E-02	0.7266E-02	0.4897E+01	0.3134E+01
36	0.821	0.2814E-02	0.1390E-01	0.2930E-02	0.7473E-02	0.4720E+01	0.3120E+01
37	0.848	0.3343E-02	0.1781E-01	0.3178E-02	0.8161E-02	0.4502E+01	0.3083E+01
38	0.874	0.3944E-02	0.2217E-01	0.3435E-02	0.9531E-02	0.4257E+01	0.3006E+01
39	0.897	0.4614E-02	0.2784E-01	0.3715E-02	0.1192E-01	0.4346E+01	0.2856E+01
40	0.919	0.5363E-02	0.3656E-01	0.4029E-02	0.1534E-01	0.3658E+01	0.2625E+01
41	0.940	0.6288E-02	0.4816E-01	0.4394E-02	0.1980E-01	0.3658E+01	0.2279E+01
42	0.960	0.7304E-02	0.4816E-01	0.4836E-02	0.2624E-01	0.3658E+01	0.2279E+01
43	0.980	0.8306E-02	0.4816E-01	0.5390E-02	0.3893E-01	0.3658E+01	0.2279E+01
44	1.000	0.9307E-02	0.4816E-01	0.6111E-02	0.5542E-01	0.3658E+01	0.2279E+01

NEW DISPLACEMENT THICKNESS
AT STATION 5

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3017E-04	-0.8076E-04	0.3502E-04	-0.1564E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3294E-04	0.6134E-03	0.3730E-04	0.5757E-03	-0.2677E+02	-0.2872E+02
3	0.020	0.4005E-04	0.6195E-03	0.4367E-04	0.4585E-03	-0.2012E+02	-0.2208E+02
4	0.028	0.4841E-04	0.1018E-02	0.4993E-04	0.7419E-03	-0.1646E+02	-0.1840E+02
5	0.037	0.5989E-04	0.1170E-02	0.5798E-04	0.7956E-03	-0.1398E+02	-0.1592E+02
6	0.046	0.7173E-04	0.8920E-03	0.6593E-04	0.6131E-03	-0.1209E+02	-0.1403E+02
7	0.056	0.7458E-04	0.1588E-03	0.7059E-04	0.7238E-03	-0.1052E+02	-0.1251E+02
8	0.067	0.1019E-03	0.2689E-02	0.1002E-03	0.2542E-02	-0.9347E+01	-0.1130E+02
9	0.080	0.1304E-03	0.1295E-02	0.1261E-03	0.1189E-02	-0.8075E+01	-0.1003E+02
10	0.095	0.1603E-03	0.1986E-02	0.1552E-03	0.1926E-02	-0.7008E+01	-0.8965E+01
11	0.112	0.1903E-03	0.1502E-02	0.1822E-03	0.1474E-02	-0.5920E+01	-0.7879E+01
12	0.133	0.2318E-03	0.1284E-02	0.2223E-03	0.1194E-02	-0.4887E+01	-0.6843E+01
13	0.156	0.2804E-03	0.1365E-02	0.2685E-03	0.1315E-02	-0.3901E+01	-0.5859E+01
14	0.183	0.3350E-03	0.1634E-02	0.3215E-03	0.1508E-02	-0.2968E+01	-0.4922E+01
15	0.212	0.3965E-03	0.1800E-02	0.3818E-03	0.1727E-02	-0.2070E+01	-0.4026E+01
16	0.242	0.4598E-03	0.1853E-02	0.4448E-03	0.1817E-02	-0.1210E+01	-0.3169E+01
17	0.272	0.5240E-03	0.1823E-02	0.5091E-03	0.1828E-02	-0.3577E+00	-0.2319E+01
18	0.301	0.5864E-03	0.1772E-02	0.5714E-03	0.1833E-02	0.6188E+00	-0.1346E+01
19	0.330	0.6485E-03	0.1738E-02	0.6314E-03	0.1666E-02	0.1476E+01	-0.4814E+00
20	0.359	0.7083E-03	0.1730E-02	0.6914E-03	0.1792E-02	0.2127E+01	0.1623E+00
21	0.387	0.7685E-03	0.1802E-02	0.7532E-03	0.1844E-02	0.2650E+01	0.6863E+00
22	0.415	0.8285E-03	0.1834E-02	0.8164E-03	0.2027E-02	0.3104E+01	0.1133E+01
23	0.443	0.8891E-03	0.1797E-02	0.8836E-03	0.2108E-02	0.3510E+01	0.1532E+01
24	0.471	0.9517E-03	0.1851E-02	0.9519E-03	0.2270E-02	0.3850E+01	0.1865E+01
25	0.499	0.1014E-02	0.1880E-02	0.1028E-02	0.2369E-02	0.4157E+01	0.2168E+01
26	0.527	0.1079E-02	0.1858E-02	0.1116E-02	0.2589E-02	0.4424E+01	0.2422E+01
27	0.556	0.1146E-02	0.1926E-02	0.1218E-02	0.3014E-02	0.4660E+01	0.2638E+01
28	0.585	0.1220E-02	0.2202E-02	0.1344E-02	0.3733E-02	0.4842E+01	0.2795E+01
29	0.614	0.1306E-02	0.2872E-02	0.1493E-02	0.4687E-02	0.4974E+01	0.2911E+01
30	0.644	0.1414E-02	0.3515E-02	0.1673E-02	0.5331E-02	0.5074E+01	0.3011E+01
31	0.674	0.1553E-02	0.4697E-02	0.1879E-02	0.5908E-02	0.5110E+01	0.3081E+01
32	0.704	0.1736E-02	0.5686E-02	0.2106E-02	0.6554E-02	0.5131E+01	0.3121E+01
33	0.734	0.1983E-02	0.7383E-02	0.2343E-02	0.6563E-02	0.5078E+01	0.3163E+01
34	0.763	0.2314E-02	0.1008E-01	0.2571E-02	0.6394E-02	0.4936E+01	0.3182E+01
35	0.793	0.2739E-02	0.1280E-01	0.2802E-02	0.6433E-02	0.4784E+01	0.3180E+01
36	0.821	0.3238E-02	0.1570E-01	0.3026E-02	0.6730E-02	0.4619E+01	0.3162E+01
37	0.848	0.3796E-02	0.1798E-01	0.3250E-02	0.7536E-02	0.4493E+01	0.3118E+01
38	0.874	0.4371E-02	0.2056E-01	0.3485E-02	0.9101E-02	0.4348E+01	0.3030E+01
39	0.897	0.4947E-02	0.2328E-01	0.3739E-02	0.1118E-01	0.4376E+01	0.2888E+01
40	0.919	0.5544E-02	0.3091E-01	0.4021E-02	0.1409E-01	0.3764E+01	0.2673E+01
41	0.940	0.6214E-02	0.3839E-01	0.4343E-02	0.1776E-01	0.2947E+01	0.2366E+01
42	0.960	0.7037E-02	0.4262E-01	0.4720E-02	0.2315E-01	0.2947E+01	0.2366E+01
43	0.980	0.8214E-02	0.6345E-01	0.5173E-02	0.3174E-01	0.2947E+01	0.2366E+01
44	1.000	0.1000E-01	0.8428E-01	0.5734E-02	0.5287E-01	0.2947E+01	0.2366E+01

NEW DISPLACEMENT THICKNESS
AT STATION 6

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.2994E-04	-0.7180E-04	0.3511E-04	-0.1546E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3283E-04	0.6263E-03	0.3743E-04	0.5799E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4012E-04	0.6494E-03	0.4383E-04	0.4624E-03	-0.2013E+02	-0.2208E+02
4	0.028	0.4887E-04	0.1068E-02	0.5012E-04	0.7443E-03	-0.1646E+02	-0.1840E+02
5	0.037	0.6096E-04	0.1241E-02	0.5823E-04	0.8050E-03	-0.1399E+02	-0.1592E+02
6	0.046	0.7354E-04	0.9441E-03	0.6637E-04	0.6429E-03	-0.1209E+02	-0.1404E+02
7	0.056	0.7658E-04	0.1455E-03	0.7199E-04	0.7741E-03	-0.1052E+02	-0.1252E+02
8	0.067	0.1030E-03	0.2660E-02	0.9964E-04	0.2483E-02	-0.9345E+01	-0.1130E+02
9	0.080	0.1320E-03	0.1332E-02	0.1263E-03	0.1203E-02	-0.8077E+01	-0.1003E+02
10	0.095	0.1622E-03	0.1984E-02	0.1556E-03	0.1950E-02	-0.7007E+01	-0.8967E+01
11	0.112	0.1931E-03	0.1533E-02	0.1833E-03	0.1501E-02	-0.5921E+01	-0.7881E+01
12	0.133	0.2349E-03	0.1359E-02	0.2240E-03	0.1218E-02	-0.4892E+01	-0.6845E+01
13	0.156	0.2841E-03	0.1487E-02	0.2707E-03	0.1362E-02	-0.3908E+01	-0.5862E+01
14	0.183	0.3394E-03	0.1674E-02	0.3243E-03	0.1548E-02	-0.2971E+01	-0.4924E+01
15	0.212	0.4017E-03	0.1832E-02	0.3852E-03	0.1741E-02	-0.2071E+01	-0.4027E+01
16	0.242	0.4662E-03	0.1607E-02	0.4490E-03	0.1842E-02	-0.1207E+01	-0.3170E+01
17	0.272	0.5313E-03	0.1887E-02	0.5143E-03	0.1883E-02	-0.3613E+00	-0.2322E+01
18	0.301	0.5952E-03	0.1756E-02	0.5773E-03	0.1860E-02	0.6197E+00	-0.1347E+01
19	0.330	0.6572E-03	0.1684E-02	0.6385E-03	0.1713E-02	0.1479E+01	-0.4840E+00
20	0.359	0.7172E-03	0.1771E-02	0.6999E-03	0.1821E-02	0.2124E+01	0.1607E+00
21	0.387	0.7765E-03	0.1874E-02	0.7638E-03	0.1938E-02	0.2646E+01	0.6810E+00
22	0.415	0.8408E-03	0.1883E-02	0.8296E-03	0.2028E-02	0.3102E+01	0.1133E+01
23	0.443	0.9040E-03	0.1831E-02	0.9015E-03	0.2269E-02	0.3508E+01	0.1523E+01
24	0.471	0.9696E-03	0.1968E-02	0.9775E-03	0.2592E-02	0.3843E+01	0.1847E+01
25	0.499	0.1034E-02	0.1957E-02	0.1065E-02	0.2884E-02	0.4152E+01	0.2139E+01
26	0.527	0.1102E-02	0.1974E-02	0.1168E-02	0.3078E-02	0.4418E+01	0.2395E+01
27	0.556	0.1176E-02	0.2105E-02	0.1287E-02	0.3747E-02	0.4650E+01	0.2597E+01
28	0.585	0.1260E-02	0.2524E-02	0.1434E-02	0.4260E-02	0.4824E+01	0.2766E+01
29	0.614	0.1364E-02	0.3422E-02	0.1607E-02	0.5053E-02	0.4943E+01	0.2890E+01
30	0.644	0.1499E-02	0.4405E-02	0.1805E-02	0.5576E-02	0.5024E+01	0.2997E+01
31	0.674	0.1675E-02	0.5868E-02	0.2018E-02	0.5980E-02	0.5045E+01	0.3077E+01
32	0.704	0.1913E-02	0.7258E-02	0.2240E-02	0.6115E-02	0.5042E+01	0.3146E+01
33	0.734	0.2229E-02	0.9554E-02	0.2454E-02	0.5777E-02	0.4956E+01	0.3207E+01
34	0.763	0.2638E-02	0.1211E-01	0.2658E-02	0.5816E-02	0.4823E+01	0.3215E+01
35	0.793	0.3122E-02	0.1350E-01	0.2860E-02	0.5743E-02	0.4744E+01	0.3219E+01
36	0.821	0.3646E-02	0.1588E-01	0.3058E-02	0.6144E-02	0.4609E+01	0.3195E+01
37	0.848	0.4163E-02	0.1630E-01	0.3262E-02	0.7066E-02	0.4587E+01	0.3145E+01
38	0.874	0.4638E-02	0.1722E-01	0.3480E-02	0.8564E-02	0.4535E+01	0.3060E+01
39	0.897	0.5090E-02	0.1985E-01	0.3719E-02	0.1050E-01	0.4431E+01	0.2919E+01
40	0.919	0.5553E-02	0.2555E-01	0.3987E-02	0.1338E-01	0.3896E+01	0.2718E+01
41	0.940	0.6077E-02	0.3901E-01	0.4291E-02	0.1692E-01	0.3240E+01	0.2443E+01
42	0.960	0.6725E-02	0.4709E-01	0.4645E-02	0.2180E-01	0.2726E+01	0.2443E+01
43	0.980	0.7587E-02	0.5413E-01	0.5070E-02	0.2942E-01	0.2279E+01	0.2443E+01
44	1.000	0.8850E-02	0.6116E-01	0.5591E-02	0.5044E-01	0.2066E+01	0.2443E+01

NEW DISPLACEMENT THICKNESS
AT STATION 7

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.2982E-04	-0.6420E-04	0.3496E-04	-0.1484E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3282E-04	0.6392E-03	0.3737E-04	0.5904E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4028E-04	0.6769E-03	0.4393E-04	0.4828E-03	-0.2013E+02	-0.2208E+02
4	0.028	0.4939E-04	0.1115E-02	0.5053E-04	0.7761E-03	-0.1646E+02	-0.1840E+02
5	0.037	0.6205E-04	0.1305E-02	0.5907E-04	0.8444E-03	-0.1399E+02	-0.1593E+02
6	0.046	0.7530E-04	0.9900E-03	0.6768E-04	0.6757E-03	-0.1210E+02	-0.1404E+02
7	0.056	0.7743E-04	0.1720E-04	0.7258E-04	0.6343E-03	-0.1051E+02	-0.1251E+02
8	0.067	0.1044E-03	0.2654E-02	0.1002E-03	0.2503E-02	-0.9345E+01	-0.1130E+02
9	0.080	0.1331E-03	0.1402E-02	0.1272E-03	0.1262E-02	-0.8081E+01	-0.1003E+02
10	0.095	0.1647E-03	0.2067E-02	0.1569E-03	0.1979E-02	-0.7012E+01	-0.8968E+01
11	0.112	0.1957E-03	0.1540E-02	0.1851E-03	0.1527E-02	-0.5922E+01	-0.7882E+01
12	0.133	0.2379E-03	0.1323E-02	0.2261E-03	0.1297E-02	-0.4890E+01	-0.6849E+01
13	0.156	0.2878E-03	0.1527E-02	0.2732E-03	0.1449E-02	-0.3910E+01	-0.5867E+01
14	0.183	0.3438E-03	0.1693E-02	0.3274E-03	0.1622E-02	-0.2972E+01	-0.4929E+01
15	0.212	0.4070E-03	0.1826E-02	0.3892E-03	0.1776E-02	-0.2071E+01	-0.4029E+01
16	0.242	0.4725E-03	0.1840E-02	0.4535E-03	0.1888E-02	-0.1209E+01	-0.3173E+01
17	0.272	0.5379E-03	0.1869E-02	0.5191E-03	0.1897E-02	-0.3604E+00	-0.2323E+01
18	0.301	0.6028E-03	0.1840E-02	0.5832E-03	0.1850E-02	0.6150E+00	-0.1347E+01
19	0.330	0.6662E-03	0.1754E-02	0.6458E-03	0.1804E-02	0.1475E+01	-0.4891E+00
20	0.359	0.7272E-03	0.1781E-02	0.7090E-03	0.1825E-02	0.2124E+01	0.1605E+00
21	0.387	0.7891E-03	0.1866E-02	0.7753E-03	0.2077E-02	0.2646E+01	0.6732E+00
22	0.415	0.8526E-03	0.1940E-02	0.8460E-03	0.2186E-02	0.3099E+01	0.1124E+01
23	0.443	0.9176E-03	0.2028E-02	0.9245E-03	0.2564E-02	0.3497E+01	0.1506E+01
24	0.471	0.9840E-03	0.2305E-02	0.1011E-02	0.2986E-02	0.3824E+01	0.1825E+01
25	0.499	0.1053E-02	0.2088E-02	0.1111E-02	0.3207E-02	0.4145E+01	0.2121E+01
26	0.527	0.1127E-02	0.2138E-02	0.1229E-02	0.3628E-02	0.4409E+01	0.2364E+01
27	0.556	0.1211E-02	0.2357E-02	0.1371E-02	0.4371E-02	0.4636E+01	0.2562E+01
28	0.585	0.1310E-02	0.2975E-02	0.1534E-02	0.4866E-02	0.4799E+01	0.2732E+01
29	0.614	0.1437E-02	0.4208E-02	0.1724E-02	0.5297E-02	0.4899E+01	0.2877E+01
30	0.644	0.1605E-02	0.5286E-02	0.1926E-02	0.5491E-02	0.4974E+01	0.3002E+01
31	0.674	0.1830E-02	0.7049E-02	0.2132E-02	0.5593E-02	0.4978E+01	0.3099E+01
32	0.704	0.2131E-02	0.9205E-02	0.2330E-02	0.5384E-02	0.4933E+01	0.3187E+01
33	0.734	0.2521E-02	0.1170E-01	0.2516E-02	0.5042E-02	0.4836E+01	0.3249E+01
34	0.763	0.2992E-02	0.1344E-01	0.2693E-02	0.5160E-02	0.4747E+01	0.3252E+01
35	0.793	0.3489E-02	0.1426E-01	0.2872E-02	0.5205E-02	0.4702E+01	0.3249E+01
36	0.821	0.3982E-02	0.1420E-01	0.3052E-02	0.5735E-02	0.4703E+01	0.3218E+01
37	0.848	0.4406E-02	0.1343E-01	0.3242E-02	0.6645E-02	0.4748E+01	0.3169E+01
38	0.874	0.4773E-02	0.1397E-01	0.3450E-02	0.8149E-02	0.4718E+01	0.3084E+01
39	0.897	0.5120E-02	0.1649E-01	0.3681E-02	0.1026E-01	0.4503E+01	0.2947E+01
40	0.919	0.5490E-02	0.2172E-01	0.3934E-02	0.1292E-01	0.4041E+01	0.2759E+01
41	0.940	0.5920E-02	0.3054E-01	0.4227E-02	0.1631E-01	0.3491E+01	0.2511E+01
42	0.960	0.6456E-02	0.4285E-01	0.4567E-02	0.2101E-01	0.3001E+01	0.2511E+01
43	0.980	0.7145E-02	0.4875E-01	0.4973E-02	0.2864E-01	0.2538E+01	0.2511E+01
44	1.000	0.8086E-02	0.5465E-01	0.5469E-02	0.4686E-01	0.2432E+01	0.2511E+01

NEW DISPLACEMENT THICKNESS
AT STATION 8

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.2980E-04	-0.5765E-04	0.3476E-04	-0.1393E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3290E-04	0.6520E-03	0.3727E-04	0.6055E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4053E-04	0.7027E-03	0.4406E-04	0.5154E-03	-0.2013E+02	-0.2208E+02
4	0.028	0.4997E-04	0.1158E-02	0.5107E-04	0.8300E-03	-0.1646E+02	-0.1841E+02
5	0.037	0.6317E-04	0.1365E-02	0.6023E-04	0.9078E-03	-0.1399E+02	-0.1593E+02
6	0.046	0.7705E-04	0.1033E-02	0.6944E-04	0.7149E-03	-0.1210E+02	-0.1404E+02
7	0.056	0.7904E-04	-0.8908E-04	0.7366E-04	0.4992E-03	-0.1051E+02	-0.1250E+02
8	0.067	0.1054E-03	0.2712E-02	0.1012E-03	0.2558E-02	-0.9348E+01	-0.1130E+02
9	0.080	0.1348E-03	0.1431E-02	0.1287E-03	0.1259E-02	-0.8082E+01	-0.1003E+02
10	0.095	0.1669E-03	0.2141E-02	0.1589E-03	0.2011E-02	-0.7016E+01	-0.8970E+01
11	0.112	0.1983E-03	0.1571E-02	0.1875E-03	0.1495E-02	-0.5924E+01	-0.7880E+01
12	0.133	0.2411E-03	0.1345E-02	0.2280E-03	0.1304E-02	-0.4891E+01	-0.6850E+01
13	0.156	0.2917E-03	0.1559E-02	0.2759E-03	0.1309E-02	-0.3912E+01	-0.5859E+01
14	0.183	0.3483E-03	0.1689E-02	0.3307E-03	0.1523E-02	-0.2971E+01	-0.4923E+01
15	0.212	0.4128E-03	0.1815E-02	0.3933E-03	0.1786E-02	-0.2070E+01	-0.4030E+01
16	0.242	0.4787E-03	0.1861E-02	0.4583E-03	0.1867E-02	-0.1210E+01	-0.3172E+01
17	0.272	0.5445E-03	0.1883E-02	0.5248E-03	0.1942E-02	-0.3611E+00	-0.2325E+01
18	0.301	0.6101E-03	0.1869E-02	0.5893E-03	0.1921E-02	0.6133E+00	-0.1351E+01
19	0.330	0.6744E-03	0.1837E-02	0.6540E-03	0.1832E-02	0.1470E+01	-0.4907E+00
20	0.359	0.7364E-03	0.1837E-02	0.7194E-03	0.1872E-02	0.2121E+01	0.1578E+00
21	0.387	0.7991E-03	0.1897E-02	0.7891E-03	0.2180E-02	0.2644E+01	0.6674E+00
22	0.415	0.8639E-03	0.1951E-02	0.8655E-03	0.2457E-02	0.3098E+01	0.1108E+01
23	0.443	0.9303E-03	0.2068E-02	0.9515E-03	0.3180E-02	0.3495E+01	0.1471E+01
24	0.471	0.9987E-03	0.2326E-02	0.1051E-02	0.3313E-02	0.3823E+01	0.1806E+01
25	0.499	0.1075E-02	0.2287E-02	0.1166E-02	0.3645E-02	0.4134E+01	0.2097E+01
26	0.527	0.1157E-02	0.2466E-02	0.1301E-02	0.4168E-02	0.4390E+01	0.2334E+01
27	0.556	0.1253E-02	0.2783E-02	0.1459E-02	0.4747E-02	0.4612E+01	0.2540E+01
28	0.585	0.1373E-02	0.3560E-02	0.1635E-02	0.5088E-02	0.4766E+01	0.2719E+01
29	0.614	0.1531E-02	0.5090E-02	0.1827E-02	0.5265E-02	0.4849E+01	0.2879E+01
30	0.644	0.1740E-02	0.6671E-02	0.2018E-02	0.5064E-02	0.4897E+01	0.3026E+01
31	0.674	0.2020E-02	0.8642E-02	0.2202E-02	0.4990E-02	0.4889E+01	0.3133E+01
32	0.704	0.2385E-02	0.1111E-01	0.2375E-02	0.4711E-02	0.4826E+01	0.3225E+01
33	0.734	0.2834E-02	0.1314E-01	0.2536E-02	0.4433E-02	0.4755E+01	0.3283E+01
34	0.763	0.3328E-02	0.1332E-01	0.2691E-02	0.4626E-02	0.4754E+01	0.3282E+01
35	0.793	0.3789E-02	0.1249E-01	0.2856E-02	0.4901E-02	0.4801E+01	0.3266E+01
36	0.821	0.4195E-02	0.1126E-01	0.3026E-02	0.5441E-02	0.4868E+01	0.3234E+01
37	0.848	0.4521E-02	0.1062E-01	0.3210E-02	0.6542E-02	0.4906E+01	0.3174E+01
38	0.874	0.4806E-02	0.1150E-01	0.3409E-02	0.7931E-02	0.4856E+01	0.3096E+01
39	0.897	0.5090E-02	0.1420E-01	0.3633E-02	0.9842E-02	0.4580E+01	0.2973E+01
40	0.919	0.5410E-02	0.1918E-01	0.3885E-02	0.1283E-01	0.4185E+01	0.2796E+01
41	0.940	0.5792E-02	0.2702E-01	0.4168E-02	0.1604E-01	0.3706E+01	0.2570E+01
42	0.960	0.6271E-02	0.4176E-01	0.4504E-02	0.2045E-01	0.3225E+01	0.2570E+01
43	0.980	0.6878E-02	0.4656E-01	0.4904E-02	0.2832E-01	0.2743E+01	0.2570E+01
44	1.000	0.7675E-02	0.5136E-01	0.5391E-02	0.4614E-01	0.2617E+01	0.2570E+01

NEW DISPLACEMENT THICKNESS
AT STATION 9

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.2985E-04	-0.5203E-04	0.3468E-04	-0.1319E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3306E-04	0.6650E-03	0.3729E-04	0.6199E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4085E-04	0.7272E-03	0.4428E-04	0.5447E-03	-0.2013E+02	-0.2208E+02
4	0.028	0.5061E-04	0.1198E-02	0.5168E-04	0.8792E-03	-0.1647E+02	-0.1841E+02
5	0.037	0.6431E-04	0.1422E-02	0.6140E-04	0.9669E-03	-0.1400E+02	-0.1593E+02
6	0.046	0.7878E-04	0.1072E-02	0.7117E-04	0.7530E-03	-0.1210E+02	-0.1404E+02
7	0.056	0.7991E-04	-0.2222E-03	0.7469E-04	0.3813E-03	-0.1050E+02	-0.1249E+02
8	0.067	0.1068E-03	0.2764E-02	0.1024E-03	0.2612E-02	-0.9351E+01	-0.1130E+02
9	0.080	0.1368E-03	0.1441E-02	0.1303E-03	0.1270E-02	-0.8083E+01	-0.1003E+02
10	0.095	0.1688E-03	0.2163E-02	0.1606E-03	0.2104E-02	-0.7018E+01	-0.8975E+01
11	0.112	0.2010E-03	0.1608E-02	0.1897E-03	0.1484E-02	-0.5926E+01	-0.7880E+01
12	0.133	0.2441E-03	0.1465E-02	0.2309E-03	0.1224E-02	-0.4898E+01	-0.6845E+01
13	0.156	0.2951E-03	0.1621E-02	0.2795E-03	0.1276E-02	-0.3915E+01	-0.5857E+01
14	0.183	0.3528E-03	0.1645E-02	0.3342E-03	0.1586E-02	-0.2969E+01	-0.4927E+01
15	0.212	0.4180E-03	0.1828E-02	0.3973E-03	0.1808E-02	-0.2071E+01	-0.4031E+01
16	0.242	0.4846E-03	0.1882E-02	0.4632E-03	0.1956E-02	-0.1211E+01	-0.3177E+01
17	0.272	0.5511E-03	0.1928E-02	0.5302E-03	0.1915E-02	-0.3637E+00	-0.2324E+01
18	0.301	0.6173E-03	0.1889E-02	0.5965E-03	0.1890E-02	0.6122E+00	-0.1349E+01
19	0.330	0.6828E-03	0.1867E-02	0.6639E-03	0.1776E-02	0.1468E+01	-0.4875E+00
20	0.359	0.7453E-03	0.1863E-02	0.7316E-03	0.2064E-02	0.2119E+01	0.1470E+00
21	0.387	0.8090E-03	0.1936E-02	0.8068E-03	0.2325E-02	0.2642E+01	0.6593E+00
22	0.415	0.8750E-03	0.2032E-02	0.8899E-03	0.2682E-02	0.3093E+01	0.1096E+01
23	0.443	0.9436E-03	0.2147E-02	0.9855E-03	0.3533E-02	0.3491E+01	0.1452E+01
24	0.471	0.1016E-02	0.2318E-02	0.1098E-02	0.3777E-02	0.3823E+01	0.1780E+01
25	0.499	0.1099E-02	0.2460E-02	0.1228E-02	0.4127E-02	0.4124E+01	0.2069E+01
26	0.527	0.1194E-02	0.2791E-02	0.1376E-02	0.4524E-02	0.4372E+01	0.2314E+01
27	0.556	0.1306E-02	0.3328E-02	0.1542E-02	0.4992E-02	0.4581E+01	0.2527E+01
28	0.585	0.1452E-02	0.4391E-02	0.1719E-02	0.5005E-02	0.4719E+01	0.2724E+01
29	0.614	0.1647E-02	0.6164E-02	0.1900E-02	0.4897E-02	0.4789E+01	0.2899E+01
30	0.644	0.1903E-02	0.7952E-02	0.2072E-02	0.4609E-02	0.4825E+01	0.3051E+01
31	0.674	0.2244E-02	0.1033E-01	0.2230E-02	0.4278E-02	0.4794E+01	0.3173E+01
32	0.704	0.2669E-02	0.1256E-01	0.2379E-02	0.4084E-02	0.4744E+01	0.3260E+01
33	0.734	0.3151E-02	0.1345E-01	0.2522E-02	0.4036E-02	0.4737E+01	0.3305E+01
34	0.763	0.3611E-02	0.1244E-01	0.2665E-02	0.4322E-02	0.4804E+01	0.3299E+01
35	0.793	0.4024E-02	0.1071E-01	0.2821E-02	0.4688E-02	0.4901E+01	0.3278E+01
36	0.821	0.4344E-02	0.9096E-02	0.2985E-02	0.5331E-02	0.4990E+01	0.3240E+01
37	0.848	0.4600E-02	0.8703E-02	0.3162E-02	0.6342E-02	0.5014E+01	0.3185E+01
38	0.874	0.4835E-02	0.9803E-02	0.3354E-02	0.7681E-02	0.4952E+01	0.3110E+01
39	0.897	0.5080E-02	0.1257E-01	0.3566E-02	0.9712E-02	0.4653E+01	0.2996E+01
40	0.919	0.5358E-02	0.1688E-01	0.3804E-02	0.1208E-01	0.4316E+01	0.2830E+01
41	0.940	0.5682E-02	0.2285E-01	0.4074E-02	0.1554E-01	0.3890E+01	0.2620E+01
42	0.960	0.6072E-02	0.3603E-01	0.4385E-02	0.1976E-01	0.3413E+01	0.2620E+01
43	0.980	0.6546E-02	0.4309E-01	0.4754E-02	0.2719E-01	0.2911E+01	0.2620E+01
44	1.000	0.7130E-02	0.5015E-01	0.5198E-02	0.4191E-01	0.2685E+01	0.2620E+01

NEW DISPLACEMENT THICKNESS
AT STATION 10

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.2996E-04	-0.4705E-04	0.3470E-04	-0.1257E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3327E-04	0.6783E-03	0.3741E-04	0.6342E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4124E-04	0.7511E-03	0.4459E-04	0.5719E-03	-0.2013E+02	-0.2208E+02
4	0.028	0.5130E-04	0.1238E-02	0.5234E-04	0.9251E-03	-0.1647E+02	-0.1841E+02
5	0.037	0.6548E-04	0.1477E-02	0.6259E-04	0.1023E-02	-0.1400E+02	-0.1594E+02
6	0.046	0.8053E-04	0.1112E-02	0.7292E-04	0.7908E-03	-0.1210E+02	-0.1404E+02
7	0.056	0.8158E-04	-0.2980E-03	0.7627E-04	0.2919E-03	-0.1049E+02	-0.1249E+02
8	0.067	0.1079E-03	0.2799E-02	0.1037E-03	0.2630E-02	-0.9353E+01	-0.1130E+02
9	0.080	0.1383E-03	0.1508E-02	0.1318E-03	0.1305E-02	-0.8087E+01	-0.1004E+02
10	0.095	0.1708E-03	0.2172E-02	0.1623E-03	0.2093E-02	-0.7018E+01	-0.8975E+01
11	0.112	0.2038E-03	0.1629E-02	0.1922E-03	0.1503E-02	-0.5927E+01	-0.7881E+01
12	0.133	0.2473E-03	0.1485E-02	0.2336E-03	0.1255E-02	-0.4899E+01	-0.6847E+01
13	0.156	0.2987E-03	0.1635E-02	0.2827E-03	0.1350E-02	-0.3916E+01	-0.5861E+01
14	0.183	0.3573E-03	0.1631E-02	0.3377E-03	0.1648E-02	-0.2968E+01	-0.4930E+01
15	0.212	0.4230E-03	0.1873E-02	0.4012E-03	0.1851E-02	-0.2074E+01	-0.4033E+01
16	0.242	0.4904E-03	0.1915E-02	0.4684E-03	0.1978E-02	-0.1213E+01	-0.3178E+01
17	0.272	0.5578E-03	0.1983E-02	0.5363E-03	0.1953E-02	-0.3668E+00	-0.2326E+01
18	0.301	0.6249E-03	0.1844E-02	0.6044E-03	0.1948E-02	0.6147E+00	-0.1352E+01
19	0.330	0.6905E-03	0.1877E-02	0.6747E-03	0.1874E-02	0.1468E+01	-0.4930E+00
20	0.359	0.7540E-03	0.1848E-02	0.7469E-03	0.2092E-02	0.2120E+01	0.1455E+00
21	0.387	0.8187E-03	0.1924E-02	0.8280E-03	0.2588E-02	0.2643E+01	0.6446E+00
22	0.415	0.8864E-03	0.2078E-02	0.9200E-03	0.2910E-02	0.3091E+01	0.1063E+01
23	0.443	0.9583E-03	0.2259E-02	0.1026E-02	0.3716E-02	0.3484E+01	0.1441E+01
24	0.471	0.1037E-02	0.2525E-02	0.1150E-02	0.3945E-02	0.3812E+01	0.1771E+01
25	0.499	0.1129E-02	0.2749E-02	0.1290E-02	0.4327E-02	0.4108E+01	0.2058E+01
26	0.527	0.1238E-02	0.3241E-02	0.1446E-02	0.4739E-02	0.4347E+01	0.2302E+01
27	0.556	0.1373E-02	0.4054E-02	0.1612E-02	0.4972E-02	0.4540E+01	0.2528E+01
28	0.585	0.1550E-02	0.5408E-02	0.1777E-02	0.4783E-02	0.4662E+01	0.2736E+01
29	0.614	0.1788E-02	0.7418E-02	0.1938E-02	0.4362E-02	0.4719E+01	0.2929E+01
30	0.644	0.2097E-02	0.9377E-02	0.2086E-02	0.4001E-02	0.4745E+01	0.3086E+01
31	0.674	0.2495E-02	0.1157E-01	0.2224E-02	0.3820E-02	0.4724E+01	0.3199E+01
32	0.704	0.2955E-02	0.1313E-01	0.2358E-02	0.3786E-02	0.4712E+01	0.3276E+01
33	0.734	0.3422E-02	0.1289E-01	0.2493E-02	0.3891E-02	0.4769E+01	0.3313E+01
34	0.763	0.3817E-02	0.1045E-01	0.2630E-02	0.4128E-02	0.4915E+01	0.3310E+01
35	0.793	0.4139E-02	0.8478E-02	0.2782E-02	0.4588E-02	0.5027E+01	0.3284E+01
36	0.821	0.4384E-02	0.7285E-02	0.2943E-02	0.5323E-02	0.5092E+01	0.3241E+01
37	0.848	0.4595E-02	0.7579E-02	0.3114E-02	0.6188E-02	0.5077E+01	0.3194E+01
38	0.874	0.4810E-02	0.9230E-02	0.3303E-02	0.7657E-02	0.4984E+01	0.3111E+01
39	0.897	0.5046E-02	0.1203E-01	0.3514E-02	0.9397E-02	0.4715E+01	0.3016E+01
40	0.919	0.5319E-02	0.1604E-01	0.3747E-02	0.1211E-01	0.4429E+01	0.2859E+01
41	0.940	0.5637E-02	0.2154E-01	0.4014E-02	0.1527E-01	0.4047E+01	0.2663E+01
42	0.960	0.6013E-02	0.3027E-01	0.4322E-02	0.1973E-01	0.3574E+01	0.2663E+01
43	0.980	0.6463E-02	0.4293E-01	0.4688E-02	0.2664E-01	0.3056E+01	0.2663E+01
44	1.000	0.7010E-02	0.5559E-01	0.5131E-02	0.4154E-01	0.2379E+01	0.2663E+01

NEW DISPLACEMENT THICKNESS
AT STATION 11

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3013E-04	-0.4252E-04	0.3481E-04	-0.1205E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3354E-04	0.6920E-03	0.3760E-04	0.6485E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4168E-04	0.7747E-03	0.4498E-04	0.5978E-03	-0.2013E+02	-0.2208E+02
4	0.028	0.5205E-04	0.1277E-02	0.5307E-04	0.9690E-03	-0.1647E+02	-0.1841E+02
5	0.037	0.6671E-04	0.1531E-02	0.6384E-04	0.1077E-02	-0.1400E+02	-0.1594E+02
6	0.046	0.8232E-04	0.1148E-02	0.7470E-04	0.8272E-03	-0.1210E+02	-0.1405E+02
7	0.056	0.8241E-04	-0.4196E-03	0.7735E-04	0.1774E-03	-0.1049E+02	-0.1248E+02
8	0.067	0.1097E-03	0.2781E-02	0.1050E-03	0.2612E-02	-0.9352E+01	-0.1130E+02
9	0.080	0.1400E-03	0.1545E-02	0.1329E-03	0.1396E-02	-0.8089E+01	-0.1004E+02
10	0.095	0.1731E-03	0.2218E-02	0.1643E-03	0.2097E-02	-0.7021E+01	-0.8975E+01
11	0.112	0.2063E-03	0.1608E-02	0.1947E-03	0.1523E-02	-0.5926E+01	-0.7882E+01
12	0.133	0.2498E-03	0.1440E-02	0.2362E-03	0.1285E-02	-0.4896E+01	-0.6849E+01
13	0.156	0.3027E-03	0.1501E-02	0.2855E-03	0.1456E-02	-0.3908E+01	-0.5867E+01
14	0.183	0.3617E-03	0.1761E-02	0.3413E-03	0.1668E-02	-0.2975E+01	-0.4931E+01
15	0.212	0.4279E-03	0.1631E-02	0.4056E-03	0.1886E-02	-0.2071E+01	-0.4035E+01
16	0.242	0.4964E-03	0.1935E-02	0.4731E-03	0.1953E-02	-0.1214E+01	-0.3176E+01
17	0.272	0.5640E-03	0.1940E-02	0.5435E-03	0.2125E-02	-0.3643E+00	-0.2336E+01
18	0.301	0.6316E-03	0.1911E-02	0.6139E-03	0.1884E-02	0.6109E+00	-0.1349E+01
19	0.330	0.6977E-03	0.1922E-02	0.6877E-03	0.2161E-02	0.1465E+01	-0.5092E+00
20	0.359	0.7626E-03	0.1934E-02	0.7662E-03	0.2363E-02	0.2115E+01	0.1303E+00
21	0.387	0.8288E-03	0.2075E-02	0.8542E-03	0.2669E-02	0.2634E+01	0.6400E+00
22	0.415	0.8991E-03	0.2320E-02	0.9547E-03	0.3267E-02	0.3077E+01	0.1063E+01
23	0.443	0.9761E-03	0.2612E-02	0.1071E-02	0.3842E-02	0.3464E+01	0.1434E+01
24	0.471	0.1062E-02	0.2855E-02	0.1203E-02	0.4084E-02	0.3793E+01	0.1763E+01
25	0.499	0.1165E-02	0.3277E-02	0.1347E-02	0.4346E-02	0.4078E+01	0.2057E+01
26	0.527	0.1293E-02	0.3713E-02	0.1500E-02	0.4680E-02	0.4320E+01	0.2305E+01
27	0.556	0.1454E-02	0.4756E-02	0.1656E-02	0.4745E-02	0.4501E+01	0.2541E+01
28	0.585	0.1668E-02	0.6571E-02	0.1803E-02	0.4342E-02	0.4597E+01	0.2761E+01
29	0.614	0.1953E-02	0.8532E-02	0.1945E-02	0.3892E-02	0.4656E+01	0.2956E+01
30	0.644	0.2315E-02	0.1085E-01	0.2075E-02	0.3563E-02	0.4662E+01	0.3110E+01
31	0.674	0.2750E-02	0.1199E-01	0.2199E-02	0.3472E-02	0.4701E+01	0.3218E+01
32	0.704	0.3214E-02	0.1248E-01	0.2325E-02	0.3581E-02	0.4749E+01	0.3288E+01
33	0.734	0.3634E-02	0.1015E-01	0.2454E-02	0.3785E-02	0.4923E+01	0.3319E+01
34	0.763	0.3968E-02	0.8532E-02	0.2589E-02	0.3913E-02	0.5023E+01	0.3322E+01
35	0.793	0.4237E-02	0.7094E-02	0.2735E-02	0.4635E-02	0.5104E+01	0.3281E+01
36	0.821	0.4465E-02	0.6826E-02	0.2888E-02	0.5064E-02	0.5117E+01	0.3255E+01
37	0.848	0.4688E-02	0.7767E-02	0.3050E-02	0.5925E-02	0.5066E+01	0.3209E+01
38	0.874	0.4918E-02	0.9370E-02	0.3227E-02	0.7251E-02	0.4976E+01	0.3134E+01
39	0.897	0.5157E-02	0.1158E-01	0.3412E-02	0.8763E-02	0.4764E+01	0.3033E+01
40	0.919	0.5403E-02	0.1430E-01	0.3617E-02	0.1107E-01	0.4520E+01	0.2883E+01
41	0.940	0.5655E-02	0.1806E-01	0.3844E-02	0.1382E-01	0.4178E+01	0.2698E+01
42	0.960	0.5916E-02	0.2528E-01	0.4098E-02	0.1772E-01	0.3714E+01	0.2698E+01
43	0.980	0.6194E-02	0.4012E-01	0.4390E-02	0.2407E-01	0.3189E+01	0.2698E+01
44	1.000	0.6492E-02	0.5496E-01	0.4733E-02	0.3775E-01	0.2414E+01	0.2698E+01

NEW DISPLACEMENT THICKNESS
AT STATION 12

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3035E-04	-0.3831E-04	0.3500E-04	-0.1162E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3386E-04	0.7063E-03	0.3788E-04	0.6630E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4218E-04	0.7985E-03	0.4545E-04	0.6225E-03	-0.2013E+02	-0.2209E+02
4	0.028	0.5286E-04	0.1316E-02	0.5387E-04	0.1011E-02	-0.1647E+02	-0.1842E+02
5	0.037	0.6800E-04	0.1586E-02	0.6512E-04	0.1130E-02	-0.1401E+02	-0.1594E+02
6	0.046	0.8419E-04	0.1188E-02	0.7650E-04	0.8636E-03	-0.1211E+02	-0.1405E+02
7	0.056	0.8427E-04	-0.4929E-03	0.7846E-04	0.7595E-04	-0.1048E+02	-0.1248E+02
8	0.067	0.1110E-03	0.2877E-02	0.1065E-03	0.2663E-02	-0.9357E+01	-0.1131E+02
9	0.080	0.1421E-03	0.1529E-02	0.1348E-03	0.1382E-02	-0.8088E+01	-0.1004E+02
10	0.095	0.1754E-03	0.2201E-02	0.1663E-03	0.2065E-02	-0.7020E+01	-0.8973E+01
11	0.112	0.2090E-03	0.1618E-02	0.1972E-03	0.1536E-02	-0.5926E+01	-0.7883E+01
12	0.133	0.2532E-03	0.1381E-02	0.2389E-03	0.1301E-02	-0.4893E+01	-0.6849E+01
13	0.156	0.3064E-03	0.1514E-02	0.2886E-03	0.1486E-02	-0.3909E+01	-0.5869E+01
14	0.183	0.3662E-03	0.1718E-02	0.3449E-03	0.1669E-02	-0.2973E+01	-0.4931E+01
15	0.212	0.4332E-03	0.1925E-02	0.4099E-03	0.1909E-02	-0.2077E+01	-0.4037E+01
16	0.242	0.5023E-03	0.1930E-02	0.4792E-03	0.1935E-02	-0.1214E+01	-0.3175E+01
17	0.272	0.5704E-03	0.1944E-02	0.5505E-03	0.2186E-02	-0.3646E+00	-0.2339E+01
18	0.301	0.6384E-03	0.1926E-02	0.6261E-03	0.2018E-02	0.6101E+00	-0.1356E+01
19	0.330	0.7057E-03	0.1962E-02	0.7035E-03	0.2116E-02	0.1463E+01	-0.5067E+00
20	0.359	0.7718E-03	0.1963E-02	0.7870E-03	0.2485E-02	0.2114E+01	0.1234E+00
21	0.387	0.8396E-03	0.2145E-02	0.8821E-03	0.3008E-02	0.2630E+01	0.6209E+00
22	0.415	0.9131E-03	0.2456E-02	0.9902E-03	0.3340E-02	0.3070E+01	0.1059E+01
23	0.443	0.9955E-03	0.2780E-02	0.1111E-02	0.3791E-02	0.3455E+01	0.1437E+01
24	0.471	0.1091E-02	0.3275E-02	0.1247E-02	0.4084E-02	0.3770E+01	0.1763E+01
25	0.499	0.1208E-02	0.3760E-02	0.1389E-02	0.4214E-02	0.4051E+01	0.2065E+01
26	0.527	0.1357E-02	0.4416E-02	0.1532E-02	0.4290E-02	0.4281E+01	0.2327E+01
27	0.556	0.1548E-02	0.5846E-02	0.1671E-02	0.4198E-02	0.4440E+01	0.2571E+01
28	0.585	0.1803E-02	0.7824E-02	0.1800E-02	0.3809E-02	0.4526E+01	0.2791E+01
29	0.614	0.2133E-02	0.9725E-02	0.1926E-02	0.3484E-02	0.4589E+01	0.2979E+01
30	0.644	0.2540E-02	0.1133E-01	0.2045E-02	0.3346E-02	0.4635E+01	0.3122E+01
31	0.674	0.2989E-02	0.1202E-01	0.2163E-02	0.3377E-02	0.4699E+01	0.3223E+01
32	0.704	0.3416E-02	0.1116E-01	0.2285E-02	0.3523E-02	0.4823E+01	0.3291E+01
33	0.734	0.3762E-02	0.8754E-02	0.2412E-02	0.3689E-02	0.5001E+01	0.3325E+01
34	0.763	0.4047E-02	0.6942E-02	0.2544E-02	0.3847E-02	0.5113E+01	0.3326E+01
35	0.793	0.4287E-02	0.6388E-02	0.2682E-02	0.4450E-02	0.5144E+01	0.3292E+01
36	0.821	0.4524E-02	0.7117E-02	0.2828E-02	0.4819E-02	0.5101E+01	0.3269E+01
37	0.848	0.4783E-02	0.8612E-02	0.2975E-02	0.5580E-02	0.5019E+01	0.3228E+01
38	0.874	0.5063E-02	0.1038E-01	0.3126E-02	0.6430E-02	0.4919E+01	0.3180E+01
39	0.897	0.5350E-02	0.1239E-01	0.3282E-02	0.7948E-02	0.4799E+01	0.3045E+01
40	0.919	0.5631E-02	0.1485E-01	0.3444E-02	0.9667E-02	0.4589E+01	0.2902E+01
41	0.940	0.5900E-02	0.1783E-01	0.3613E-02	0.1195E-01	0.4286E+01	0.2726E+01
42	0.960	0.6158E-02	0.2328E-01	0.3795E-02	0.1522E-01	0.3835E+01	0.2726E+01
43	0.980	0.6409E-02	0.3774E-01	0.3995E-02	0.2087E-01	0.3313E+01	0.2726E+01
44	1.000	0.6660E-02	0.5218E-01	0.4213E-02	0.3480E-01	0.2570E+01	0.2726E+01

NEW DISPLACEMENT THICKNESS
AT STATION 13

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3061E-04	-0.3450E-04	0.3528E-04	-0.1129E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3423E-04	0.7210E-03	0.3825E-04	0.6776E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4273E-04	0.8224E-03	0.4601E-04	0.6458E-03	-0.2014E+02	-0.2209E+02
4	0.028	0.5372E-04	0.1356E-02	0.5474E-04	0.1051E-02	-0.1647E+02	-0.1842E+02
5	0.037	0.6935E-04	0.1641E-02	0.6646E-04	0.1180E-02	-0.1401E+02	-0.1595E+02
6	0.046	0.8612E-04	0.1226E-02	0.7835E-04	0.8999E-03	-0.1211E+02	-0.1405E+02
7	0.056	0.8520E-04	-0.6042E-03	0.8030E-04	-0.2960E-05	-0.1048E+02	-0.1247E+02
8	0.067	0.1128E-03	0.2911E-02	0.1078E-03	0.2704E-02	-0.9359E+01	-0.1131E+02
9	0.080	0.1440E-03	0.1550E-02	0.1365E-03	0.1411E-02	-0.8089E+01	-0.1004E+02
10	0.095	0.1778E-03	0.2297E-02	0.1665E-03	0.2108E-02	-0.7025E+01	-0.8975E+01
11	0.112	0.2115E-03	0.1718E-02	0.1998E-03	0.1539E-02	-0.5932E+01	-0.7883E+01
12	0.133	0.2566E-03	0.1393E-02	0.2417E-03	0.1281E-02	-0.4894E+01	-0.6848E+01
13	0.156	0.3105E-03	0.1509E-02	0.2914E-03	0.1584E-02	-0.3909E+01	-0.5874E+01
14	0.183	0.3705E-03	0.1661E-02	0.3488E-03	0.1683E-02	-0.2970E+01	-0.4932E+01
15	0.212	0.4380E-03	0.1977E-02	0.4148E-03	0.1913E-02	-0.2080E+01	-0.4037E+01
16	0.242	0.5080E-03	0.1964E-02	0.4862E-03	0.2075E-02	-0.1216E+01	-0.3183E+01
17	0.272	0.5768E-03	0.1959E-02	0.5595E-03	0.2129E-02	-0.3654E+00	-0.2336E+01
18	0.301	0.6453E-03	0.1930E-02	0.6372E-03	0.2277E-02	0.6099E+00	-0.1371E+01
19	0.330	0.7134E-03	0.1951E-02	0.7196E-03	0.2521E-02	0.1464E+01	-0.5294E+00
20	0.359	0.7811E-03	0.2031E-02	0.8095E-03	0.2694E-02	0.2110E+01	0.1117E+00
21	0.387	0.8510E-03	0.2264E-02	0.9097E-03	0.3014E-02	0.2624E+01	0.6206E+00
22	0.415	0.9283E-03	0.2620E-02	0.1022E-02	0.3408E-02	0.3060E+01	0.1055E+01
23	0.443	0.1016E-02	0.3107E-02	0.1145E-02	0.3581E-02	0.3437E+01	0.1449E+01
24	0.471	0.1124E-02	0.3723E-02	0.1276E-02	0.3816E-02	0.3744E+01	0.1778E+01
25	0.499	0.1260E-02	0.4348E-02	0.1408E-02	0.3814E-02	0.4018E+01	0.2087E+01
26	0.527	0.1432E-02	0.5359E-02	0.1538E-02	0.3810E-02	0.4228E+01	0.2354E+01
27	0.556	0.1657E-02	0.7031E-02	0.1662E-02	0.3675E-02	0.4373E+01	0.2601E+01
28	0.585	0.1954E-02	0.9055E-02	0.1778E-02	0.3326E-02	0.4457E+01	0.2818E+01
29	0.614	0.2323E-02	0.1033E-01	0.1894E-02	0.3307E-02	0.4555E+01	0.2989E+01
30	0.644	0.2754E-02	0.1147E-01	0.2008E-02	0.3273E-02	0.4627E+01	0.3127E+01
31	0.674	0.3181E-02	0.1076E-01	0.2125E-02	0.3334E-02	0.4770E+01	0.3226E+01
32	0.704	0.3544E-02	0.8811E-02	0.2246E-02	0.3474E-02	0.4955E+01	0.3294E+01
33	0.734	0.3812E-02	0.6433E-02	0.2372E-02	0.3663E-02	0.5132E+01	0.3326E+01
34	0.763	0.4037E-02	0.5592E-02	0.2503E-02	0.3974E-02	0.5188E+01	0.3318E+01
35	0.793	0.4248E-02	0.5873E-02	0.2637E-02	0.4196E-02	0.5173E+01	0.3306E+01
36	0.821	0.4476E-02	0.7040E-02	0.2777E-02	0.4924E-02	0.5105E+01	0.3263E+01
37	0.848	0.4732E-02	0.8451E-02	0.2924E-02	0.5474E-02	0.5028E+01	0.3234E+01
38	0.874	0.5007E-02	0.1025E-01	0.3073E-02	0.6486E-02	0.4927E+01	0.3177E+01
39	0.897	0.5283E-02	0.1214E-01	0.3225E-02	0.7687E-02	0.4824E+01	0.3053E+01
40	0.919	0.5544E-02	0.1400E-01	0.3384E-02	0.9673E-02	0.4640E+01	0.2915E+01
41	0.940	0.5785E-02	0.1626E-01	0.3553E-02	0.1203E-01	0.4370E+01	0.2746E+01
42	0.960	0.6005E-02	0.2134E-01	0.3735E-02	0.1512E-01	0.3939E+01	0.2746E+01
43	0.980	0.6207E-02	0.3511E-01	0.3933E-02	0.2062E-01	0.3430E+01	0.2746E+01
44	1.000	0.6400E-02	0.4888E-01	0.4155E-02	0.3404E-01	0.2756E+01	0.2746E+01

NEW DISPLACEMENT THICKNESS
AT STATION 14

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3092E-04	-0.3091E-04	0.3565E-04	-0.1105E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3465E-04	0.7364E-03	0.3870E-04	0.6925E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4333E-04	0.8467E-03	0.4665E-04	0.6680E-03	-0.2014E+02	-0.2209E+02
4	0.028	0.5465E-04	0.1396E-02	0.5568E-04	0.1089E-02	-0.1648E+02	-0.1842E+02
5	0.037	0.7077E-04	0.1697E-02	0.6785E-04	0.1228E-02	-0.1401E+02	-0.1595E+02
6	0.046	0.8814E-04	0.1267E-02	0.8020E-04	0.9333E-03	-0.1211E+02	-0.1405E+02
7	0.056	0.8723E-04	-0.6916E-03	0.8142E-04	-0.1132E-03	-0.1047E+02	-0.1247E+02
8	0.067	0.1142E-03	0.2961E-02	0.1095E-03	0.2729E-02	-0.9362E+01	-0.1131E+02
9	0.080	0.1460E-03	0.1588E-02	0.1383E-03	0.1432E-02	-0.8091E+01	-0.1004E+02
10	0.095	0.1803E-03	0.2330E-02	0.1706E-03	0.2172E-02	-0.7027E+01	-0.8979E+01
11	0.112	0.2143E-03	0.1781E-02	0.2025E-03	0.1546E-02	-0.5935E+01	-0.7883E+01
12	0.133	0.2599E-03	0.1408E-02	0.2446E-03	0.1339E-02	-0.4894E+01	-0.6852E+01
13	0.156	0.3146E-03	0.1584E-02	0.2946E-03	0.1642E-02	-0.3913E+01	-0.5877E+01
14	0.183	0.3752E-03	0.1731E-02	0.3533E-03	0.1585E-02	-0.2974E+01	-0.4927E+01
15	0.212	0.4429E-03	0.1860E-02	0.4201E-03	0.1933E-02	-0.2073E+01	-0.4038E+01
16	0.242	0.5138E-03	0.2035E-02	0.4933E-03	0.2182E-02	-0.1220E+01	-0.3189E+01
17	0.272	0.5833E-03	0.2013E-02	0.5694E-03	0.2224E-02	-0.3685E+00	-0.2341E+01
18	0.301	0.6526E-03	0.1926E-02	0.6507E-03	0.2334E-02	0.6101E+00	-0.1374E+01
19	0.330	0.7212E-03	0.1941E-02	0.7377E-03	0.2604E-02	0.1464E+01	-0.5340E+00
20	0.359	0.7911E-03	0.1965E-02	0.8311E-03	0.2757E-02	0.2114E+01	0.1081E+00
21	0.387	0.8646E-03	0.2171E-02	0.9337E-03	0.3119E-02	0.2629E+01	0.6147E+00
22	0.415	0.9463E-03	0.2529E-02	0.1046E-02	0.3403E-02	0.3065E+01	0.1055E+01
23	0.443	0.1044E-02	0.3137E-02	0.1166E-02	0.3441E-02	0.3435E+01	0.1457E+01
24	0.471	0.1164E-02	0.3989E-02	0.1289E-02	0.3477E-02	0.3729E+01	0.1797E+01
25	0.499	0.1316E-02	0.5366E-02	0.1410E-02	0.3511E-02	0.3961E+01	0.2104E+01
26	0.527	0.1516E-02	0.6243E-02	0.1527E-02	0.3457E-02	0.4178E+01	0.2374E+01
27	0.556	0.1776E-02	0.8038E-02	0.1640E-02	0.3409E-02	0.4317E+01	0.2616E+01
28	0.585	0.2110E-02	0.9992E-02	0.1751E-02	0.3259E-02	0.4405E+01	0.2822E+01
29	0.614	0.2502E-02	0.1104E-01	0.1861E-02	0.3354E-02	0.4515E+01	0.2986E+01
30	0.644	0.2925E-02	0.1046E-01	0.1975E-02	0.3275E-02	0.4684E+01	0.3126E+01
31	0.674	0.3304E-02	0.8550E-02	0.2092E-02	0.3332E-02	0.4894E+01	0.3226E+01
32	0.704	0.3588E-02	0.6974E-02	0.2213E-02	0.3496E-02	0.5058E+01	0.3293E+01
33	0.734	0.3787E-02	0.4932E-02	0.2339E-02	0.3730E-02	0.5216E+01	0.3322E+01
34	0.763	0.3967E-02	0.4679E-02	0.2470E-02	0.3953E-02	0.5240E+01	0.3320E+01
35	0.793	0.4152E-02	0.5461E-02	0.2606E-02	0.4284E-02	0.5196E+01	0.3301E+01
36	0.821	0.4363E-02	0.6641E-02	0.2745E-02	0.4843E-02	0.5128E+01	0.3268E+01
37	0.848	0.4601E-02	0.8197E-02	0.2897E-02	0.5698E-02	0.5042E+01	0.3222E+01
38	0.874	0.4852E-02	0.9533E-02	0.3052E-02	0.6703E-02	0.4967E+01	0.3165E+01
39	0.897	0.5105E-02	0.1093E-01	0.3214E-02	0.7939E-02	0.4840E+01	0.3056E+01
40	0.919	0.5340E-02	0.1314E-01	0.3386E-02	0.1011E-01	0.4674E+01	0.2921E+01
41	0.940	0.5554E-02	0.1549E-01	0.3573E-02	0.1256E-01	0.4431E+01	0.2759E+01
42	0.960	0.5751E-02	0.2030E-01	0.3778E-02	0.1579E-01	0.4025E+01	0.2759E+01
43	0.980	0.5935E-02	0.3010E-01	0.4006E-02	0.2140E-01	0.3539E+01	0.2759E+01
44	1.000	0.6108E-02	0.3991E-01	0.4267E-02	0.3435E-01	0.3260E+01	0.2759E+01

NEW DISPLACEMENT THICKNESS
AT STATION 15

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3128E-04	-0.2757E-04	0.3612E-04	-0.1092E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3511E-04	0.7525E-03	0.3925E-04	0.7077E-03	-0.2677E+02	-0.2873E+02
3	0.020	0.4399E-04	0.8715E-03	0.4739E-04	0.6889E-03	-0.2014E+02	-0.2209E+02
4	0.028	0.5563E-04	0.1437E-02	0.5669E-04	0.1125E-02	-0.1648E+02	-0.1842E+02
5	0.037	0.7226E-04	0.1755E-02	0.6928E-04	0.1273E-02	-0.1402E+02	-0.1595E+02
6	0.046	0.9024E-04	0.1310E-02	0.8210E-04	0.9674E-03	-0.1211E+02	-0.1405E+02
7	0.056	0.8938E-04	-0.7558E-03	0.8344E-04	-0.1682E-03	-0.1047E+02	-0.1246E+02
8	0.067	0.1157E-03	0.3050E-02	0.1108E-03	0.2843E-02	-0.9367E+01	-0.1132E+02
9	0.080	0.1483E-03	0.1594E-02	0.1407E-03	0.1397E-02	-0.8092E+01	-0.1004E+02
10	0.095	0.1823E-03	0.2270E-02	0.1724E-03	0.2125E-02	-0.7024E+01	-0.8976E+01
11	0.112	0.2175E-03	0.1760E-02	0.2052E-03	0.1540E-02	-0.5934E+01	-0.7883E+01
12	0.133	0.2635E-03	0.1516E-02	0.2476E-03	0.1444E-02	-0.4900E+01	-0.6857E+01
13	0.156	0.3179E-03	0.1738E-02	0.2980E-03	0.1612E-02	-0.3922E+01	-0.5876E+01
14	0.183	0.3796E-03	0.1805E-02	0.3579E-03	0.1647E-02	-0.2978E+01	-0.4930E+01
15	0.212	0.4472E-03	0.1889E-02	0.4259E-03	0.2015E-02	-0.2075E+01	-0.4043E+01
16	0.242	0.5194E-03	0.2089E-02	0.5011E-03	0.2219E-02	-0.1223E+01	-0.3191E+01
17	0.272	0.5895E-03	0.2047E-02	0.5799E-03	0.2389E-02	-0.3703E+00	-0.2351E+01
18	0.301	0.6596E-03	0.2012E-02	0.6639E-03	0.2434E-02	0.6053E+00	-0.1379E+01
19	0.330	0.7295E-03	0.2010E-02	0.7531E-03	0.2667E-02	0.1460E+01	-0.5376E+00
20	0.359	0.8033E-03	0.2131E-02	0.8483E-03	0.2780E-02	0.2104E+01	0.1068E+00
21	0.387	0.8802E-03	0.2513E-02	0.9505E-03	0.3069E-02	0.2610E+01	0.6175E+00
22	0.415	0.9681E-03	0.3228E-02	0.1060E-02	0.3296E-02	0.3026E+01	0.1061E+01
23	0.443	0.1075E-02	0.3933E-02	0.1173E-02	0.3260E-02	0.3390E+01	0.1467E+01
24	0.471	0.1209E-02	0.4788E-02	0.1287E-02	0.3317E-02	0.3685E+01	0.1806E+01
25	0.499	0.1384E-02	0.6035E-02	0.1398E-02	0.3327E-02	0.3923E+01	0.2114E+01
26	0.527	0.1611E-02	0.7214E-02	0.1507E-02	0.3306E-02	0.4124E+01	0.2382E+01
27	0.556	0.1904E-02	0.9077E-02	0.1615E-02	0.3263E-02	0.4258E+01	0.2624E+01
28	0.585	0.2265E-02	0.1070E-01	0.1724E-02	0.3224E-02	0.4365E+01	0.2824E+01
29	0.614	0.2662E-02	0.1058E-01	0.1832E-02	0.3229E-02	0.4541E+01	0.2993E+01
30	0.644	0.3046E-02	0.9139E-02	0.1948E-02	0.3263E-02	0.4758E+01	0.3127E+01
31	0.674	0.3351E-02	0.6601E-02	0.2066E-02	0.3392E-02	0.5003E+01	0.3223E+01
32	0.704	0.3561E-02	0.5224E-02	0.2187E-02	0.3559E-02	0.5157E+01	0.3289E+01
33	0.734	0.3713E-02	0.4254E-02	0.2314E-02	0.3723E-02	0.5254E+01	0.3323E+01
34	0.763	0.3866E-02	0.4268E-02	0.2446E-02	0.4008E-02	0.5263E+01	0.3316E+01
35	0.793	0.4038E-02	0.5189E-02	0.2584E-02	0.4434E-02	0.5211E+01	0.3293E+01
36	0.821	0.4241E-02	0.6544E-02	0.2729E-02	0.4923E-02	0.5133E+01	0.3263E+01
37	0.848	0.4469E-02	0.7923E-02	0.2882E-02	0.5769E-02	0.5058E+01	0.3218E+01
38	0.874	0.4713E-02	0.9408E-02	0.3045E-02	0.6883E-02	0.4974E+01	0.3155E+01
39	0.897	0.4959E-02	0.1104E-01	0.3216E-02	0.8458E-02	0.4851E+01	0.3056E+01
40	0.919	0.5191E-02	0.1293E-01	0.3400E-02	0.1029E-01	0.4696E+01	0.2923E+01
41	0.940	0.5412E-02	0.1574E-01	0.3602E-02	0.1288E-01	0.4473E+01	0.2765E+01
42	0.960	0.5617E-02	0.1998E-01	0.3826E-02	0.1624E-01	0.4094E+01	0.2765E+01
43	0.980	0.5816E-02	0.2900E-01	0.4078E-02	0.2181E-01	0.3636E+01	0.2765E+01
44	1.000	0.6009E-02	0.3801E-01	0.4368E-02	0.3450E-01	0.3366E+01	0.2765E+01

NEW DISPLACEMENT THICKNESS
AT STATION 16

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3166E-04	-0.2421E-04	0.3665E-04	-0.1084E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3561E-04	0.7694E-03	0.3986E-04	0.7235E-03	-0.2678E+02	-0.2873E+02
3	0.020	0.4470E-04	0.8973E-03	0.4819E-04	0.7098E-03	-0.2014E+02	-0.2209E+02
4	0.028	0.5667E-04	0.1480E-02	0.5778E-04	0.1161E-02	-0.1648E+02	-0.1842E+02
5	0.037	0.7383E-04	0.1815E-02	0.7079E-04	0.1318E-02	-0.1402E+02	-0.1595E+02
6	0.046	0.9243E-04	0.1352E-02	0.8406E-04	0.9993E-03	-0.1212E+02	-0.1406E+02
7	0.056	0.9047E-04	-0.9004E-03	0.8464E-04	-0.2808E-03	-0.1046E+02	-0.1246E+02
8	0.067	0.1177E-03	0.3077E-02	0.1128E-03	0.2926E-02	-0.9369E+01	-0.1132E+02
9	0.080	0.1505E-03	0.1625E-02	0.1429E-03	0.1359E-02	-0.8093E+01	-0.1004E+02
10	0.095	0.1850E-03	0.2302E-02	0.1749E-03	0.2182E-02	-0.7025E+01	-0.8980E+01
11	0.112	0.2205E-03	0.1811E-02	0.2062E-03	0.1655E-02	-0.5937E+01	-0.7889E+01
12	0.133	0.2670E-03	0.1529E-02	0.2506E-03	0.1279E-02	-0.4901E+01	-0.6848E+01
13	0.156	0.3218E-03	0.1750E-02	0.3024E-03	0.1416E-02	-0.3922E+01	-0.5865E+01
14	0.183	0.3844E-03	0.1802E-02	0.3627E-03	0.1759E-02	-0.2978E+01	-0.4936E+01
15	0.212	0.4523E-03	0.2024E-02	0.4319E-03	0.2040E-02	-0.2082E+01	-0.4044E+01
16	0.242	0.5255E-03	0.2087E-02	0.5093E-03	0.2308E-02	-0.1223E+01	-0.3196E+01
17	0.272	0.5965E-03	0.2050E-02	0.5901E-03	0.2378E-02	-0.3705E+00	-0.2350E+01
18	0.301	0.6679E-03	0.2016E-02	0.6759E-03	0.2469E-02	0.6051E+00	-0.1381E+01
19	0.330	0.7401E-03	0.1928E-02	0.7649E-03	0.2692E-02	0.1465E+01	-0.5390E+00
20	0.359	0.8171E-03	0.2369E-02	0.8599E-03	0.2825E-02	0.2091E+01	0.1043E+00
21	0.387	0.8967E-03	0.2813E-02	0.9592E-03	0.3024E-02	0.2593E+01	0.6200E+00
22	0.415	0.9929E-03	0.3133E-02	0.1063E-02	0.3142E-02	0.3032E+01	0.1070E+01
23	0.443	0.1112E-02	0.3872E-02	0.1170E-02	0.3207E-02	0.3394E+01	0.1470E+01
24	0.471	0.1264E-02	0.5068E-02	0.1277E-02	0.3149E-02	0.3669E+01	0.1816E+01
25	0.499	0.1461E-02	0.6585E-02	0.1382E-02	0.3143E-02	0.3892E+01	0.2125E+01
26	0.527	0.1714E-02	0.8014E-02	0.1487E-02	0.3212E-02	0.4079E+01	0.2387E+01
27	0.556	0.2033E-02	0.9692E-02	0.1594E-02	0.3219E-02	0.4224E+01	0.2626E+01
28	0.585	0.2405E-02	0.1033E-01	0.1703E-02	0.3205E-02	0.4386E+01	0.2825E+01
29	0.614	0.2775E-02	0.9382E-02	0.1813E-02	0.3144E-02	0.4608E+01	0.2998E+01
30	0.644	0.3102E-02	0.7445E-02	0.1930E-02	0.3352E-02	0.4853E+01	0.3122E+01
31	0.674	0.3335E-02	0.4989E-02	0.2048E-02	0.3455E-02	0.5094E+01	0.3219E+01
32	0.704	0.3493E-02	0.3934E-02	0.2170E-02	0.3562E-02	0.5229E+01	0.3289E+01
33	0.734	0.3615E-02	0.3588E-02	0.2297E-02	0.3770E-02	0.5291E+01	0.3320E+01
34	0.763	0.3757E-02	0.4091E-02	0.2429E-02	0.4098E-02	0.5273E+01	0.3311E+01
35	0.793	0.3926E-02	0.5306E-02	0.2568E-02	0.4441E-02	0.5205E+01	0.3292E+01
36	0.821	0.4125E-02	0.6484E-02	0.2715E-02	0.4947E-02	0.5137E+01	0.3262E+01
37	0.848	0.4352E-02	0.7948E-02	0.2872E-02	0.5833E-02	0.5056E+01	0.3214E+01
38	0.874	0.4596E-02	0.9374E-02	0.3039E-02	0.7149E-02	0.4976E+01	0.3140E+01
39	0.897	0.4844E-02	0.1126E-01	0.3218E-02	0.8803E-02	0.4856E+01	0.3052E+01
40	0.919	0.5085E-02	0.1337E-01	0.3416E-02	0.1087E-01	0.4707E+01	0.2920E+01
41	0.940	0.5325E-02	0.1609E-01	0.3636E-02	0.1355E-01	0.4500E+01	0.2766E+01
42	0.960	0.5553E-02	0.2042E-01	0.3885E-02	0.1671E-01	0.4146E+01	0.2766E+01
43	0.980	0.5785E-02	0.2830E-01	0.4173E-02	0.2298E-01	0.3720E+01	0.2766E+01
44	1.000	0.6018E-02	0.3618E-01	0.4510E-02	0.2721E-01	0.3469E+01	0.2766E+01

NEW DISPLACEMENT THICKNESS
AT STATION 17

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3206E-04	-0.2046E-04	0.3722E-04	-0.1078E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3613E-04	0.7875E-03	0.4051E-04	0.7403E-03	-0.2678E+02	-0.2873E+02
3	0.020	0.4544E-04	0.9251E-03	0.4906E-04	0.7317E-03	-0.2014E+02	-0.2209E+02
4	0.028	0.5778E-04	0.1526E-02	0.5895E-04	0.1200E-02	-0.1648E+02	-0.1843E+02
5	0.037	0.7550E-04	0.1880E-02	0.7242E-04	0.1367E-02	-0.1402E+02	-0.1596E+02
6	0.046	0.9461E-04	0.1401E-02	0.8619E-04	0.1036E-02	-0.1212E+02	-0.1406E+02
7	0.056	0.9289E-04	-0.9727E-03	0.8683E-04	-0.3238E-03	-0.1046E+02	-0.1245E+02
8	0.067	0.1193E-03	0.3157E-02	0.1148E-03	0.2960E-02	-0.9373E+01	-0.1132E+02
9	0.080	0.1529E-03	0.1665E-02	0.1450E-03	0.1347E-02	-0.8096E+01	-0.1004E+02
10	0.095	0.1878E-03	0.2281E-02	0.1777E-03	0.2223E-02	-0.7024E+01	-0.8982E+01
11	0.112	0.2241E-03	0.1814E-02	0.2092E-03	0.1661E-02	-0.5937E+01	-0.7890E+01
12	0.133	0.2709E-03	0.1566E-02	0.2544E-03	0.1344E-02	-0.4903E+01	-0.6852E+01
13	0.156	0.3262E-03	0.1792E-02	0.3070E-03	0.1474E-02	-0.3925E+01	-0.5868E+01
14	0.183	0.3895E-03	0.1809E-02	0.3682E-03	0.1669E-02	-0.2978E+01	-0.4931E+01
15	0.212	0.4581E-03	0.2041E-02	0.4385E-03	0.2098E-02	-0.2083E+01	-0.4047E+01
16	0.242	0.5323E-03	0.2167E-02	0.5171E-03	0.2310E-02	-0.1227E+01	-0.3197E+01
17	0.272	0.6051E-03	0.2119E-02	0.5988E-03	0.2388E-02	-0.3744E+00	-0.2351E+01
18	0.301	0.6775E-03	0.2121E-02	0.6847E-03	0.2458E-02	0.5992E+00	-0.1381E+01
19	0.330	0.7519E-03	0.2113E-02	0.7728E-03	0.2542E-02	0.1455E+01	-0.5306E+00
20	0.359	0.8313E-03	0.2218E-02	0.8660E-03	0.2745E-02	0.2099E+01	0.1088E+00
21	0.387	0.9208E-03	0.2650E-02	0.9613E-03	0.2892E-02	0.2602E+01	0.6275E+00
22	0.415	0.1026E-02	0.3487E-02	0.1060E-02	0.3009E-02	0.3012E+01	0.1077E+01
23	0.443	0.1158E-02	0.4587E-02	0.1162E-02	0.3075E-02	0.3353E+01	0.1477E+01
24	0.471	0.1327E-02	0.5767E-02	0.1265E-02	0.3279E-02	0.3630E+01	0.1808E+01
25	0.499	0.1543E-02	0.7127E-02	0.1369E-02	0.3150E-02	0.3862E+01	0.2124E+01
26	0.527	0.1820E-02	0.8579E-02	0.1473E-02	0.3138E-02	0.4047E+01	0.2392E+01
27	0.556	0.2153E-02	0.9895E-02	0.1580E-02	0.3193E-02	0.4212E+01	0.2628E+01
28	0.585	0.2514E-02	0.9570E-02	0.1690E-02	0.3218E-02	0.4428E+01	0.2824E+01
29	0.614	0.2837E-02	0.7888E-02	0.1802E-02	0.3251E-02	0.4692E+01	0.2992E+01
30	0.644	0.3097E-02	0.5796E-02	0.1916E-02	0.3495E-02	0.4946E+01	0.3114E+01
31	0.674	0.3273E-02	0.4141E-02	0.2036E-02	0.3478E-02	0.5142E+01	0.3218E+01
32	0.704	0.3398E-02	0.3266E-02	0.2160E-02	0.3637E-02	0.5267E+01	0.3285E+01
33	0.734	0.3510E-02	0.3130E-02	0.2289E-02	0.3893E-02	0.5317E+01	0.3313E+01
34	0.763	0.3645E-02	0.4331E-02	0.2425E-02	0.4198E-02	0.5259E+01	0.3306E+01
35	0.793	0.3814E-02	0.5284E-02	0.2569E-02	0.4550E-02	0.5206E+01	0.3286E+01
36	0.821	0.4014E-02	0.6555E-02	0.2722E-02	0.5150E-02	0.5133E+01	0.3251E+01
37	0.848	0.4239E-02	0.7900E-02	0.2886E-02	0.6055E-02	0.5059E+01	0.3202E+01
38	0.874	0.4478E-02	0.9497E-02	0.3059E-02	0.7330E-02	0.4969E+01	0.3130E+01
39	0.897	0.4725E-02	0.1102E-01	0.3244E-02	0.8904E-02	0.4858E+01	0.3046E+01
40	0.919	0.4966E-02	0.1331E-01	0.3447E-02	0.1088E-01	0.4712E+01	0.2914E+01
41	0.940	0.5206E-02	0.1611E-01	0.3669E-02	0.1357E-01	0.4514E+01	0.2763E+01
42	0.960	0.5445E-02	0.2025E-01	0.3918E-02	0.1687E-01	0.4185E+01	0.2763E+01
43	0.980	0.5685E-02	0.2755E-01	0.4203E-02	0.2226E-01	0.3790E+01	0.2763E+01
44	1.000	0.5937E-02	0.3485E-01	0.4535E-02	0.2936E-01	0.3544E+01	0.2763E+01

NEW DISPLACEMENT THICKNESS
AT STATION 18

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3247E-04	-0.1617E-04	0.3783E-04	-0.1071E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3667E-04	0.8070E-03	0.4122E-04	0.7584E-03	-0.2678E+02	-0.2874E+02
3	0.020	0.4623E-04	0.9556E-03	0.4999E-04	0.7553E-03	-0.2014E+02	-0.2209E+02
4	0.028	0.5897E-04	0.1576E-02	0.6021E-04	0.1241E-02	-0.1649E+02	-0.1843E+02
5	0.037	0.7732E-04	0.1952E-02	0.7417E-04	0.1420E-02	-0.1403E+02	-0.1596E+02
6	0.046	0.9739E-04	0.1453E-02	0.8850E-04	0.1074E-02	-0.1212E+02	-0.1406E+02
7	0.056	0.9419E-04	-0.1145E-02	0.8830E-04	-0.4465E-03	-0.1045E+02	-0.1245E+02
8	0.067	0.1216E-03	0.3189E-02	0.1169E-03	0.2988E-02	-0.9375E+01	-0.1132E+02
9	0.080	0.1556E-03	0.1717E-02	0.1477E-03	0.1393E-02	-0.8099E+01	-0.1004E+02
10	0.095	0.1909E-03	0.2295E-02	0.1808E-03	0.2295E-02	-0.7025E+01	-0.8986E+01
11	0.112	0.2278E-03	0.1854E-02	0.2132E-03	0.1674E-02	-0.5939E+01	-0.7890E+01
12	0.133	0.2750E-03	0.1639E-02	0.2578E-03	0.1373E-02	-0.4907E+01	-0.6853E+01
13	0.156	0.3308E-03	0.1768E-02	0.3111E-03	0.1467E-02	-0.3923E+01	-0.5868E+01
14	0.183	0.3947E-03	0.1645E-02	0.3729E-03	0.1662E-02	-0.2969E+01	-0.4931E+01
15	0.212	0.4647E-03	0.2049E-02	0.4441E-03	0.2116E-02	-0.2084E+01	-0.4048E+01
16	0.242	0.5396E-03	0.2223E-02	0.5238E-03	0.2390E-02	-0.1231E+01	-0.3201E+01
17	0.272	0.6141E-03	0.2085E-02	0.6058E-03	0.2480E-02	-0.3725E+00	-0.2356E+01
18	0.301	0.6890E-03	0.2079E-02	0.6909E-03	0.2416E-02	0.6015E+00	-0.1378E+01
19	0.330	0.7666E-03	0.2113E-02	0.7776E-03	0.2389E-02	0.1455E+01	-0.5220E+00
20	0.359	0.8478E-03	0.2615E-02	0.8678E-03	0.2625E-02	0.2077E+01	0.1155E+00
21	0.387	0.9442E-03	0.2981E-02	0.9600E-03	0.2807E-02	0.2583E+01	0.6322E+00
22	0.415	0.1060E-02	0.3525E-02	0.1056E-02	0.2964E-02	0.3009E+01	0.1080E+01
23	0.443	0.1205E-02	0.4613E-02	0.1155E-02	0.3063E-02	0.3352E+01	0.1478E+01
24	0.471	0.1389E-02	0.5987E-02	0.1256E-02	0.3157E-02	0.3617E+01	0.1815E+01
25	0.499	0.1625E-02	0.7565E-02	0.1361E-02	0.3079E-02	0.3837E+01	0.2128E+01
26	0.527	0.1917E-02	0.8880E-02	0.1466E-02	0.3172E-02	0.4030E+01	0.2390E+01
27	0.556	0.2248E-02	0.9744E-02	0.1573E-02	0.3192E-02	0.4221E+01	0.2628E+01
28	0.585	0.2578E-02	0.8865E-02	0.1682E-02	0.3257E-02	0.4468E+01	0.2822E+01
29	0.614	0.2848E-02	0.6589E-02	0.1794E-02	0.3310E-02	0.4765E+01	0.2988E+01
30	0.644	0.3050E-02	0.4641E-02	0.1908E-02	0.3320E-02	0.5011E+01	0.3124E+01
31	0.674	0.3187E-02	0.3447E-02	0.2031E-02	0.3467E-02	0.5181E+01	0.3218E+01
32	0.704	0.3297E-02	0.3105E-02	0.2156E-02	0.3690E-02	0.5276E+01	0.3282E+01
33	0.734	0.3411E-02	0.3268E-02	0.2287E-02	0.3911E-02	0.5309E+01	0.3312E+01
34	0.763	0.3545E-02	0.4460E-02	0.2427E-02	0.4278E-02	0.5252E+01	0.3301E+01
35	0.793	0.3720E-02	0.5409E-02	0.2575E-02	0.4717E-02	0.5199E+01	0.3277E+01
36	0.821	0.3923E-02	0.6658E-02	0.2732E-02	0.5269E-02	0.5127E+01	0.3244E+01
37	0.848	0.4147E-02	0.7985E-02	0.2901E-02	0.6155E-02	0.5054E+01	0.3196E+01
38	0.874	0.4388E-02	0.9558E-02	0.3077E-02	0.7431E-02	0.4966E+01	0.3124E+01
39	0.897	0.4637E-02	0.1117E-01	0.3269E-02	0.8950E-02	0.4858E+01	0.3039E+01
40	0.919	0.4886E-02	0.1347E-01	0.3478E-02	0.1111E-01	0.4713E+01	0.2908E+01
41	0.940	0.5138E-02	0.1626E-01	0.3705E-02	0.1373E-01	0.4521E+01	0.2758E+01
42	0.960	0.5392E-02	0.2049E-01	0.3963E-02	0.1629E-01	0.4213E+01	0.2758E+01
43	0.980	0.5658E-02	0.2715E-01	0.4259E-02	0.2191E-01	0.3848E+01	0.2758E+01
44	1.000	0.5940E-02	0.3380E-01	0.4604E-02	0.3171E-01	0.3603E+01	0.2758E+01

NEW DISPLACEMENT THICKNESS
AT STATION 19

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3292E-04	-0.1160E-04	0.3853E-04	-0.1069E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3726E-04	0.8280E-03	0.4201E-04	0.7775E-03	-0.2678E+02	-0.2874E+02
3	0.020	0.4708E-04	0.9884E-03	0.5102E-04	0.7796E-03	-0.2015E+02	-0.2209E+02
4	0.028	0.6025E-04	0.1631E-02	0.6158E-04	0.1284E-02	-0.1649E+02	-0.1843E+02
5	0.037	0.7928E-04	0.2031E-02	0.7607E-04	0.1475E-02	-0.1403E+02	-0.1596E+02
6	0.046	0.1002E-03	0.1514E-02	0.9098E-04	0.1117E-02	-0.1212E+02	-0.1406E+02
7	0.056	0.9698E-04	-0.1224E-02	0.9098E-04	-0.4956E-03	-0.1044E+02	-0.1244E+02
8	0.067	0.1238E-03	0.3210E-02	0.1190E-03	0.3057E-02	-0.9376E+01	-0.1133E+02
9	0.080	0.1584E-03	0.1752E-02	0.1504E-03	0.1411E-02	-0.8101E+01	-0.1004E+02
10	0.095	0.1946E-03	0.2455E-02	0.1838E-03	0.2314E-02	-0.7034E+01	-0.8987E+01
11	0.112	0.2313E-03	0.1866E-02	0.2167E-03	0.1686E-02	-0.5940E+01	-0.7891E+01
12	0.133	0.2799E-03	0.1532E-02	0.2620E-03	0.1356E-02	-0.4901E+01	-0.6852E+01
13	0.156	0.3362E-03	0.1836E-02	0.3156E-03	0.1572E-02	-0.3927E+01	-0.5873E+01
14	0.183	0.4005E-03	0.1715E-02	0.3781E-03	0.1723E-02	-0.2973E+01	-0.4934E+01
15	0.212	0.4715E-03	0.2074E-02	0.4491E-03	0.2083E-02	-0.2085E+01	-0.4046E+01
16	0.242	0.5477E-03	0.2248E-02	0.5284E-03	0.2375E-02	-0.1232E+01	-0.3200E+01
17	0.272	0.6241E-03	0.2139E-02	0.6097E-03	0.2372E-02	-0.3755E+00	-0.2350E+01
18	0.301	0.7013E-03	0.2125E-02	0.6936E-03	0.2387E-02	0.5989E+00	-0.1377E+01
19	0.330	0.7820E-03	0.2240E-02	0.7796E-03	0.2437E-02	0.1447E+01	-0.5247E+00
20	0.359	0.8683E-03	0.2689E-02	0.8681E-03	0.2723E-02	0.2073E+01	0.1100E+00
21	0.387	0.9722E-03	0.3253E-02	0.9589E-03	0.2825E-02	0.2568E+01	0.6312E+00
22	0.415	0.1098E-02	0.3685E-02	0.1054E-02	0.2959E-02	0.2989E+01	0.1080E+01
23	0.443	0.1256E-02	0.5068E-02	0.1152E-02	0.3025E-02	0.3326E+01	0.1480E+01
24	0.471	0.1456E-02	0.6440E-02	0.1253E-02	0.2999E-02	0.3592E+01	0.1824E+01
25	0.499	0.1705E-02	0.7765E-02	0.1358E-02	0.3041E-02	0.3826E+01	0.2131E+01
26	0.527	0.2001E-02	0.8772E-02	0.1463E-02	0.3158E-02	0.4036E+01	0.2390E+01
27	0.556	0.2313E-02	0.9083E-02	0.1569E-02	0.3194E-02	0.4258E+01	0.2628E+01
28	0.585	0.2600E-02	0.7684E-02	0.1678E-02	0.3267E-02	0.4534E+01	0.2821E+01
29	0.614	0.2816E-02	0.5545E-02	0.1790E-02	0.3289E-02	0.4824E+01	0.2990E+01
30	0.644	0.2977E-02	0.3923E-02	0.1905E-02	0.3366E-02	0.5051E+01	0.3121E+01
31	0.674	0.3091E-02	0.3143E-02	0.2027E-02	0.3731E-02	0.5198E+01	0.3204E+01
32	0.704	0.3196E-02	0.3224E-02	0.2155E-02	0.3784E-02	0.5269E+01	0.3277E+01
33	0.734	0.3317E-02	0.3775E-02	0.2290E-02	0.4021E-02	0.5281E+01	0.3306E+01
34	0.763	0.3456E-02	0.4564E-02	0.2433E-02	0.4391E-02	0.5246E+01	0.3295E+01
35	0.793	0.3636E-02	0.5678E-02	0.2584E-02	0.4774E-02	0.5184E+01	0.3274E+01
36	0.821	0.3844E-02	0.6648E-02	0.2746E-02	0.5362E-02	0.5116E+01	0.3239E+01
37	0.848	0.4076E-02	0.8228E-02	0.2915E-02	0.6265E-02	0.5041E+01	0.3190E+01
38	0.874	0.4325E-02	0.9771E-02	0.3095E-02	0.7344E-02	0.4954E+01	0.3129E+01
39	0.897	0.4585E-02	0.1165E-01	0.3291E-02	0.9047E-02	0.4857E+01	0.3031E+01
40	0.919	0.4853E-02	0.1385E-01	0.3498E-02	0.1118E-01	0.4711E+01	0.2901E+01
41	0.940	0.5126E-02	0.1680E-01	0.3728E-02	0.1335E-01	0.4525E+01	0.2753E+01
42	0.960	0.5412E-02	0.2090E-01	0.3988E-02	0.1605E-01	0.4236E+01	0.2753E+01
43	0.980	0.5714E-02	0.2919E-01	0.4285E-02	0.2127E-01	0.3896E+01	0.2753E+01
44	1.000	0.6044E-02	0.3749E-01	0.4632E-02	0.2980E-01	0.3396E+01	0.2753E+01

NEW DISPLACEMENT THICKNESS
AT STATION 20

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3341E-04	-0.6913E-05	0.3933E-04	-0.1074E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3791E-04	0.8505E-03	0.4291E-04	0.7976E-03	-0.2678E+02	-0.2874E+02
3	0.020	0.4800E-04	0.1023E-02	0.5217E-04	0.8040E-03	-0.2015E+02	-0.2210E+02
4	0.028	0.6162E-04	0.1688E-02	0.6306E-04	0.1327E-02	-0.1649E+02	-0.1843E+02
5	0.037	0.8137E-04	0.2115E-02	0.7807E-04	0.1531E-02	-0.1404E+02	-0.1596E+02
6	0.046	0.1032E-03	0.1579E-02	0.9356E-04	0.1156E-02	-0.1213E+02	-0.1407E+02
7	0.056	0.9921E-04	-0.1382E-02	0.9269E-04	-0.6202E-03	-0.1043E+02	-0.1244E+02
8	0.067	0.1263E-03	0.3264E-02	0.1215E-03	0.3090E-02	-0.9379E+01	-0.1133E+02
9	0.080	0.1615E-03	0.1802E-02	0.1531E-03	0.1444E-02	-0.8103E+01	-0.1004E+02
10	0.095	0.1977E-03	0.2440E-02	0.1869E-03	0.2328E-02	-0.7033E+01	-0.8988E+01
11	0.112	0.2349E-03	0.2019E-02	0.2196E-03	0.1581E-02	-0.5949E+01	-0.7885E+01
12	0.133	0.2843E-03	0.1667E-02	0.2657E-03	0.1309E-02	-0.4909E+01	-0.6850E+01
13	0.156	0.3415E-03	0.1784E-02	0.3197E-03	0.1580E-02	-0.3924E+01	-0.5874E+01
14	0.183	0.4070E-03	0.1820E-02	0.3825E-03	0.1744E-02	-0.2979E+01	-0.4936E+01
15	0.212	0.4787E-03	0.2101E-02	0.4533E-03	0.2090E-02	-0.2086E+01	-0.4047E+01
16	0.242	0.5561E-03	0.2250E-02	0.5324E-03	0.2442E-02	-0.1232E+01	-0.3204E+01
17	0.272	0.6356E-03	0.2234E-02	0.6133E-03	0.2381E-02	-0.3809E+00	-0.2350E+01
18	0.301	0.7139E-03	0.2272E-02	0.6962E-03	0.2440E-02	0.5906E+00	-0.1380E+01
19	0.330	0.7990E-03	0.2265E-02	0.7816E-03	0.2469E-02	0.1446E+01	-0.5265E+00
20	0.359	0.8930E-03	0.2554E-02	0.8692E-03	0.2629E-02	0.2081E+01	0.1153E+00
21	0.387	0.1005E-02	0.3487E-02	0.9603E-03	0.2708E-02	0.2555E+01	0.6378E+00
22	0.415	0.1138E-02	0.4558E-02	0.1054E-02	0.2883E-02	0.2951E+01	0.1085E+01
23	0.443	0.1306E-02	0.5504E-02	0.1152E-02	0.2965E-02	0.3302E+01	0.1482E+01
24	0.471	0.1518E-02	0.6649E-02	0.1253E-02	0.3047E-02	0.3580E+01	0.1821E+01
25	0.499	0.1772E-02	0.7817E-02	0.1356E-02	0.3318E-02	0.3823E+01	0.2115E+01
26	0.527	0.2058E-02	0.8408E-02	0.1460E-02	0.3184E-02	0.4056E+01	0.2389E+01
27	0.556	0.2342E-02	0.7972E-02	0.1566E-02	0.3180E-02	0.4320E+01	0.2628E+01
28	0.585	0.2583E-02	0.6358E-02	0.1674E-02	0.3227E-02	0.4609E+01	0.2824E+01
29	0.614	0.2754E-02	0.4527E-02	0.1786E-02	0.3369E-02	0.4881E+01	0.2965E+01
30	0.644	0.2889E-02	0.3460E-02	0.1904E-02	0.3509E-02	0.5077E+01	0.3113E+01
31	0.674	0.2999E-02	0.3086E-02	0.2027E-02	0.3600E-02	0.5201E+01	0.3211E+01
32	0.704	0.3109E-02	0.3358E-02	0.2161E-02	0.3821E-02	0.5262E+01	0.3275E+01
33	0.734	0.3238E-02	0.3927E-02	0.2300E-02	0.4132E-02	0.5272E+01	0.3300E+01
34	0.763	0.3391E-02	0.4713E-02	0.2448E-02	0.4479E-02	0.5238E+01	0.3290E+01
35	0.793	0.3568E-02	0.5879E-02	0.2604E-02	0.4869E-02	0.5173E+01	0.3268E+01
36	0.821	0.3780E-02	0.7013E-02	0.2770E-02	0.5530E-02	0.5107E+01	0.3229E+01
37	0.848	0.4013E-02	0.8282E-02	0.2944E-02	0.6341E-02	0.5038E+01	0.3186E+01
38	0.874	0.4261E-02	0.9797E-02	0.3132E-02	0.7527E-02	0.4952E+01	0.3119E+01
39	0.897	0.4522E-02	0.1175E-01	0.3333E-02	0.9236E-02	0.4856E+01	0.3025E+01
40	0.919	0.4792E-02	0.1417E-01	0.3551E-02	0.1111E-01	0.4710E+01	0.2895E+01
41	0.940	0.5073E-02	0.1701E-01	0.3797E-02	0.1366E-01	0.4526E+01	0.2748E+01
42	0.960	0.5369E-02	0.2097E-01	0.4074E-02	0.1683E-01	0.4257E+01	0.2748E+01
43	0.980	0.5690E-02	0.2726E-01	0.4396E-02	0.2128E-01	0.3941E+01	0.2748E+01
44	1.000	0.6040E-02	0.3354E-01	0.4777E-02	0.2899E-01	0.3617E+01	0.2748E+01

NEW DISPLACEMENT THICKNESS
AT STATION 21

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3396E-04	-0.2224E-05	0.4024E-04	-0.1087E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.3861E-04	0.8743E-03	0.4390E-04	0.8187E-03	-0.2678E+02	-0.2874E+02
3	0.020	0.4900E-04	0.1060E-02	0.5342E-04	0.8285E-03	-0.2015E+02	-0.2210E+02
4	0.028	0.6311E-04	0.1749E-02	0.6466E-04	0.1371E-02	-0.1650E+02	-0.1844E+02
5	0.037	0.8362E-04	0.2204E-02	0.8018E-04	0.1586E-02	-0.1404E+02	-0.1597E+02
6	0.046	0.1064E-03	0.1647E-02	0.9622E-04	0.1194E-02	-0.1213E+02	-0.1407E+02
7	0.056	0.1008E-03	-0.1617E-02	0.9320E-04	-0.9780E-03	-0.1042E+02	-0.1242E+02
8	0.067	0.1289E-03	0.3356E-02	0.1241E-03	0.3303E-02	-0.9384E+01	-0.1134E+02
9	0.080	0.1643E-03	0.1654E-02	0.1562E-03	0.1460E-02	-0.8106E+01	-0.1005E+02
10	0.095	0.2013E-03	0.2308E-02	0.1896E-03	0.2266E-02	-0.7026E+01	-0.8984E+01
11	0.112	0.2388E-03	0.1956E-02	0.2234E-03	0.1596E-02	-0.5945E+01	-0.7886E+01
12	0.133	0.2893E-03	0.1502E-02	0.2696E-03	0.1400E-02	-0.4900E+01	-0.6855E+01
13	0.156	0.3476E-03	0.1742E-02	0.3231E-03	0.1715E-02	-0.3922E+01	-0.5882E+01
14	0.183	0.4139E-03	0.1887E-02	0.3863E-03	0.1814E-02	-0.2983E+01	-0.4939E+01
15	0.212	0.4864E-03	0.2122E-02	0.4569E-03	0.2093E-02	-0.2088E+01	-0.4047E+01
16	0.242	0.5652E-03	0.2303E-02	0.5357E-03	0.2325E-02	-0.1235E+01	-0.3197E+01
17	0.272	0.6465E-03	0.2323E-02	0.6175E-03	0.2334E-02	-0.3859E+00	-0.2347E+01
18	0.301	0.7281E-03	0.2265E-02	0.6998E-03	0.2369E-02	0.5911E+00	-0.1376E+01
19	0.330	0.8172E-03	0.2436E-02	0.7846E-03	0.2430E-02	0.1436E+01	-0.5243E+00
20	0.359	0.9161E-03	0.2894E-02	0.8711E-03	0.2633E-02	0.2061E+01	0.1151E+00
21	0.387	0.1033E-02	0.3900E-02	0.9625E-03	0.2745E-02	0.2532E+01	0.6357E+00
22	0.415	0.1177E-02	0.4420E-02	0.1056E-02	0.2865E-02	0.2959E+01	0.1066E+01
23	0.443	0.1356E-02	0.5597E-02	0.1152E-02	0.2989E-02	0.3297E+01	0.1482E+01
24	0.471	0.1573E-02	0.6720E-02	0.1252E-02	0.3063E-02	0.3576E+01	0.1820E+01
25	0.499	0.1826E-02	0.7570E-02	0.1352E-02	0.3081E-02	0.3837E+01	0.2128E+01
26	0.527	0.2093E-02	0.7777E-02	0.1457E-02	0.3097E-02	0.4092E+01	0.2394E+01
27	0.556	0.2344E-02	0.6920E-02	0.1563E-02	0.3189E-02	0.4379E+01	0.2628E+01
28	0.585	0.2546E-02	0.5302E-02	0.1673E-02	0.3337E-02	0.4668E+01	0.2818E+01
29	0.614	0.2689E-02	0.3853E-02	0.1788E-02	0.3454E-02	0.4919E+01	0.2980E+01
30	0.644	0.2811E-02	0.3453E-02	0.1909E-02	0.3589E-02	0.5077E+01	0.3109E+01
31	0.674	0.2922E-02	0.3365E-02	0.2039E-02	0.3733E-02	0.5185E+01	0.3203E+01
32	0.704	0.3042E-02	0.3725E-02	0.2175E-02	0.4161E-02	0.5241E+01	0.3255E+01
33	0.734	0.3182E-02	0.4314E-02	0.2321E-02	0.4280E-02	0.5251E+01	0.3292E+01
34	0.763	0.3346E-02	0.5139E-02	0.2474E-02	0.4551E-02	0.5214E+01	0.3286E+01
35	0.793	0.3535E-02	0.5887E-02	0.2635E-02	0.4982E-02	0.5172E+01	0.3262E+01
36	0.821	0.3742E-02	0.7110E-02	0.2804E-02	0.5630E-02	0.5101E+01	0.3224E+01
37	0.848	0.3979E-02	0.8457E-02	0.2983E-02	0.6423E-02	0.5028E+01	0.3181E+01
38	0.874	0.4229E-02	0.9895E-02	0.3177E-02	0.7680E-02	0.4947E+01	0.3110E+01
39	0.897	0.4494E-02	0.1181E-01	0.3381E-02	0.9184E-02	0.4858E+01	0.3021E+01
40	0.919	0.4771E-02	0.1425E-01	0.3610E-02	0.1118E-01	0.4712E+01	0.2891E+01
41	0.940	0.5064E-02	0.1698E-01	0.3864E-02	0.1384E-01	0.4534E+01	0.2746E+01
42	0.960	0.5379E-02	0.2105E-01	0.4153E-02	0.1643E-01	0.4279E+01	0.2746E+01
43	0.980	0.5724E-02	0.2687E-01	0.4492E-02	0.2099E-01	0.3986E+01	0.2746E+01
44	1.000	0.6112E-02	0.3269E-01	0.4894E-02	0.2761E-01	0.3665E+01	0.2746E+01

NEW DISPLACEMENT THICKNESS
AT STATION 22

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3456E-04	0.2217E-05	0.4119E-04	-0.1103E-03	-0.4799E+02	-0.4995E+02
2	0.012	0.3939E-04	0.6999E-03	0.4496E-04	0.8412E-03	-0.2678E+02	-0.2874E+02
3	0.020	0.5008E-04	0.1098E-02	0.5475E-04	0.8551E-03	-0.2015E+02	-0.2210E+02
4	0.028	0.6470E-04	0.1814E-02	0.6636E-04	0.1418E-02	-0.1650E+02	-0.1844E+02
5	0.037	0.8603E-04	0.2299E-02	0.8244E-04	0.1647E-02	-0.1405E+02	-0.1597E+02
6	0.046	0.1098E-03	0.1721E-02	0.9909E-04	0.1238E-02	-0.1214E+02	-0.1407E+02
7	0.056	0.1024E-03	-0.1957E-02	0.9548E-04	-0.1154E-02	-0.1040E+02	-0.1241E+02
8	0.067	0.1315E-03	0.3603E-02	0.1232E-03	0.3255E-02	-0.9398E+01	-0.1134E+02
9	0.080	0.1679E-03	0.1861E-02	0.1585E-03	0.1696E-02	-0.8107E+01	-0.1006E+02
10	0.095	0.2050E-03	0.2247E-02	0.1927E-03	0.2182E-02	-0.7022E+01	-0.8980E+01
11	0.112	0.2436E-03	0.1973E-02	0.2275E-03	0.1668E-02	-0.5946E+01	-0.7890E+01
12	0.133	0.2951E-03	0.1570E-02	0.2732E-03	0.1558E-02	-0.4904E+01	-0.6864E+01
13	0.156	0.3538E-03	0.1726E-02	0.3269E-03	0.1685E-02	-0.3921E+01	-0.5880E+01
14	0.183	0.4205E-03	0.2021E-02	0.3908E-03	0.1816E-02	-0.2990E+01	-0.4940E+01
15	0.212	0.4946E-03	0.2158E-02	0.4614E-03	0.2054E-02	-0.2090E+01	-0.4045E+01
16	0.242	0.5750E-03	0.2386E-02	0.5400E-03	0.2358E-02	-0.1240E+01	-0.3199E+01
17	0.272	0.6587E-03	0.2461E-02	0.6216E-03	0.2309E-02	-0.3937E+00	-0.2346E+01
18	0.301	0.7438E-03	0.2339E-02	0.7034E-03	0.2295E-02	0.5869E+00	-0.1372E+01
19	0.330	0.8362E-03	0.2606E-02	0.7878E-03	0.2395E-02	0.1427E+01	-0.5223E+00
20	0.359	0.9412E-03	0.2814E-02	0.8736E-03	0.2611E-02	0.2066E+01	0.1163E+00
21	0.387	0.1065E-02	0.4199E-02	0.9644E-03	0.2754E-02	0.2515E+01	0.6352E+00
22	0.415	0.1216E-02	0.4618E-02	0.1056E-02	0.2866E-02	0.2948E+01	0.1085E+01
23	0.443	0.1401E-02	0.5654E-02	0.1152E-02	0.2989E-02	0.3293E+01	0.1482E+01
24	0.471	0.1619E-02	0.6516E-02	0.1251E-02	0.3057E-02	0.3588E+01	0.1821E+01
25	0.499	0.1862E-02	0.6954E-02	0.1354E-02	0.3088E-02	0.3872E+01	0.2128E+01
26	0.527	0.2107E-02	0.7183E-02	0.1460E-02	0.3205E-02	0.4125E+01	0.2388E+01
27	0.556	0.2328E-02	0.6013E-02	0.1568E-02	0.3312E-02	0.4430E+01	0.2621E+01
28	0.585	0.2503E-02	0.4920E-02	0.1682E-02	0.3386E-02	0.4690E+01	0.2815E+01
29	0.614	0.2638E-02	0.3532E-02	0.1801E-02	0.3543E-02	0.4937E+01	0.2975E+01
30	0.644	0.2755E-02	0.3510E-02	0.1929E-02	0.3715E-02	0.5074E+01	0.3102E+01
31	0.674	0.2877E-02	0.3700E-02	0.2064E-02	0.3890E-02	0.5166E+01	0.3195E+01
32	0.704	0.3010E-02	0.4082E-02	0.2204E-02	0.4120E-02	0.5221E+01	0.3258E+01
33	0.734	0.3160E-02	0.4630E-02	0.2355E-02	0.4315E-02	0.5233E+01	0.3290E+01
34	0.763	0.3332E-02	0.5294E-02	0.2512E-02	0.4630E-02	0.5205E+01	0.3281E+01
35	0.793	0.3523E-02	0.6177E-02	0.2674E-02	0.5070E-02	0.5156E+01	0.3257E+01
36	0.821	0.3734E-02	0.7171E-02	0.2845E-02	0.5714E-02	0.5098E+01	0.3219E+01
37	0.848	0.3965E-02	0.8400E-02	0.3026E-02	0.6477E-02	0.5031E+01	0.3178E+01
38	0.874	0.4211E-02	0.9856E-02	0.3223E-02	0.7797E-02	0.4949E+01	0.3103E+01
39	0.897	0.4476E-02	0.1171E-01	0.3435E-02	0.9473E-02	0.4864E+01	0.3019E+01
40	0.919	0.4757E-02	0.1416E-01	0.3671E-02	0.1145E-01	0.4719E+01	0.2891E+01
41	0.940	0.5058E-02	0.1693E-01	0.3938E-02	0.1402E-01	0.4546E+01	0.2748E+01
42	0.960	0.5389E-02	0.2010E-01	0.4244E-02	0.1657E-01	0.4307E+01	0.2748E+01
43	0.980	0.5761E-02	0.2550E-01	0.4605E-02	0.2114E-01	0.4036E+01	0.2748E+01
44	1.000	0.6183E-02	0.3091E-01	0.5037E-02	0.2741E-01	0.3765E+01	0.2748E+01

NEW DISPLACEMENT THICKNESS
AT STATION 23

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3522E-04	0.7316E-05	0.4217E-04	-0.1106E-03	-0.4799E+02	-0.4995E+02
2	0.012	0.4023E-04	0.9274E-03	0.4605E-04	0.8660E-03	-0.2678E+02	-0.2874E+02
3	0.020	0.5126E-04	0.1140E-02	0.5615E-04	0.8856E-03	-0.2015E+02	-0.2210E+02
4	0.028	0.6643E-04	0.1883E-02	0.6817E-04	0.1472E-02	-0.1650E+02	-0.1844E+02
5	0.037	0.8863E-04	0.2401E-02	0.8490E-04	0.1718E-02	-0.1405E+02	-0.1598E+02
6	0.046	0.1135E-03	0.1805E-02	0.1023E-03	0.1292E-02	-0.1214E+02	-0.1407E+02
7	0.056	0.1061E-03	-0.2069E-02	0.9902E-04	-0.1210E-02	-0.1040E+02	-0.1240E+02
8	0.067	0.1344E-03	0.3670E-02	0.1257E-03	0.3327E-02	-0.9402E+01	-0.1134E+02
9	0.080	0.1715E-03	0.1904E-02	0.1612E-03	0.1647E-02	-0.8109E+01	-0.1006E+02
10	0.095	0.2071E-03	0.2332E-02	0.1975E-03	0.2280E-02	-0.7027E+01	-0.8985E+01
11	0.112	0.2485E-03	0.1987E-02	0.2315E-03	0.1801E-02	-0.5947E+01	-0.7898E+01
12	0.133	0.3007E-03	0.1718E-02	0.2769E-03	0.1532E-02	-0.4912E+01	-0.6862E+01
13	0.156	0.3587E-03	0.1912E-02	0.3320E-03	0.1636E-02	-0.3932E+01	-0.5877E+01
14	0.183	0.4273E-03	0.2123E-02	0.3947E-03	0.1915E-02	-0.2996E+01	-0.4945E+01
15	0.212	0.5033E-03	0.2193E-02	0.4657E-03	0.2059E-02	-0.2092E+01	-0.4045E+01
16	0.242	0.5852E-03	0.2417E-02	0.5439E-03	0.2309E-02	-0.1242E+01	-0.3196E+01
17	0.272	0.6725E-03	0.2605E-02	0.6258E-03	0.2430E-02	-0.4017E+00	-0.2353E+01
18	0.301	0.7593E-03	0.2509E-02	0.7061E-03	0.2374E-02	0.5773E+00	-0.1376E+01
19	0.330	0.8564E-03	0.2649E-02	0.7897E-03	0.2365E-02	0.1424E+01	-0.5207E+00
20	0.359	0.9657E-03	0.3241E-02	0.8760E-03	0.2538E-02	0.2042E+01	0.1204E+00
21	0.387	0.1095E-02	0.4215E-02	0.9653E-03	0.2749E-02	0.2514E+01	0.6354E+00
22	0.415	0.1252E-02	0.4879E-02	0.1058E-02	0.2829E-02	0.2933E+01	0.1088E+01
23	0.443	0.1439E-02	0.5743E-02	0.1155E-02	0.3019E-02	0.3288E+01	0.1480E+01
24	0.471	0.1655E-02	0.6424E-02	0.1256E-02	0.3131E-02	0.3593E+01	0.1817E+01
25	0.499	0.1888E-02	0.6654E-02	0.1362E-02	0.3301E-02	0.3889E+01	0.2116E+01
26	0.527	0.2117E-02	0.6576E-02	0.1472E-02	0.3544E-02	0.4159E+01	0.2369E+01
27	0.556	0.2322E-02	0.5751E-02	0.1587E-02	0.3443E-02	0.4445E+01	0.2614E+01
28	0.585	0.2487E-02	0.4729E-02	0.1707E-02	0.3538E-02	0.4700E+01	0.2806E+01
29	0.614	0.2624E-02	0.3964E-02	0.1832E-02	0.3649E-02	0.4913E+01	0.2969E+01
30	0.644	0.2744E-02	0.3677E-02	0.1963E-02	0.3823E-02	0.5065E+01	0.3096E+01
31	0.674	0.2876E-02	0.3999E-02	0.2101E-02	0.4027E-02	0.5150E+01	0.3187E+01
32	0.704	0.3016E-02	0.4293E-02	0.2245E-02	0.4069E-02	0.5209E+01	0.3261E+01
33	0.734	0.3169E-02	0.4752E-02	0.2396E-02	0.4565E-02	0.5226E+01	0.3276E+01
34	0.763	0.3339E-02	0.5372E-02	0.2553E-02	0.4758E-02	0.5201E+01	0.3274E+01
35	0.793	0.3525E-02	0.6040E-02	0.2717E-02	0.5101E-02	0.5163E+01	0.3255E+01
36	0.821	0.3731E-02	0.6988E-02	0.2891E-02	0.5801E-02	0.5108E+01	0.3214E+01
37	0.848	0.3954E-02	0.8224E-02	0.3074E-02	0.6717E-02	0.5041E+01	0.3164E+01
38	0.874	0.4199E-02	0.9766E-02	0.3279E-02	0.7956E-02	0.4954E+01	0.3095E+01
39	0.897	0.4462E-02	0.1163E-01	0.3498E-02	0.9649E-02	0.4875E+01	0.3022E+01
40	0.919	0.4749E-02	0.1391E-01	0.3748E-02	0.1167E-01	0.4734E+01	0.2898E+01
41	0.940	0.5064E-02	0.1670E-01	0.4031E-02	0.1444E-01	0.4567E+01	0.2758E+01
42	0.960	0.5416E-02	0.2000E-01	0.4361E-02	0.1744E-01	0.4345E+01	0.2758E+01
43	0.980	0.5820E-02	0.2443E-01	0.4754E-02	0.2173E-01	0.4095E+01	0.2758E+01
44	1.000	0.6292E-02	0.2886E-01	0.5234E-02	0.2811E-01	0.3881E+01	0.2758E+01

NEW DISPLACEMENT THICKNESS
AT STATION 24

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3596E-04	0.1258E-04	0.4318E-04	-0.1102E-03	-0.4799E+02	-0.4994E+02
2	0.012	0.4116E-04	0.9565E-03	0.4719E-04	0.8922E-03	-0.2679E+02	-0.2874E+02
3	0.020	0.5255E-04	0.1184E-02	0.5763E-04	0.9198E-03	-0.2016E+02	-0.2210E+02
4	0.028	0.6830E-04	0.1957E-02	0.7012E-04	0.1533E-02	-0.1651E+02	-0.1845E+02
5	0.037	0.9142E-04	0.2509E-02	0.8757E-04	0.1799E-02	-0.1406E+02	-0.1598E+02
6	0.046	0.1174E-03	0.1890E-02	0.1058E-03	0.1349E-02	-0.1215E+02	-0.1408E+02
7	0.056	0.1081E-03	-0.2335E-02	0.1015E-03	-0.1367E-02	-0.1038E+02	-0.1240E+02
8	0.067	0.1378E-03	0.3625E-02	0.1288E-03	0.3354E-02	-0.9400E+01	-0.1135E+02
9	0.080	0.1752E-03	0.1951E-02	0.1647E-03	0.1682E-02	-0.8112E+01	-0.1006E+02
10	0.095	0.2121E-03	0.2610E-02	0.2013E-03	0.2348E-02	-0.7043E+01	-0.8989E+01
11	0.112	0.2532E-03	0.2064E-02	0.2347E-03	0.1577E-02	-0.5951E+01	-0.7885E+01
12	0.133	0.3066E-03	0.1635E-02	0.2818E-03	0.1335E-02	-0.4907E+01	-0.6851E+01
13	0.156	0.3659E-03	0.1839E-02	0.3358E-03	0.1760E-02	-0.3927E+01	-0.5884E+01
14	0.183	0.4362E-03	0.2078E-02	0.3986E-03	0.1832E-02	-0.2993E+01	-0.4940E+01
15	0.212	0.5123E-03	0.2242E-02	0.4698E-03	0.2048E-02	-0.2094E+01	-0.4045E+01
16	0.242	0.5959E-03	0.2537E-02	0.5474E-03	0.2374E-02	-0.1248E+01	-0.3200E+01
17	0.272	0.6838E-03	0.2593E-02	0.6285E-03	0.2479E-02	-0.4011E+00	-0.2356E+01
18	0.301	0.7771E-03	0.2589E-02	0.7090E-03	0.2319E-02	0.5728E+00	-0.1373E+01
19	0.330	0.8752E-03	0.2743E-02	0.7928E-03	0.2400E-02	0.1419E+01	-0.5226E+00
20	0.359	0.9901E-03	0.3397E-02	0.8800E-03	0.2634E-02	0.2033E+01	0.1150E+00
21	0.387	0.1122E-02	0.4333E-02	0.9713E-03	0.2854E-02	0.2507E+01	0.6296E+00
22	0.415	0.1285E-02	0.4999E-02	0.1069E-02	0.2968E-02	0.2927E+01	0.1080E+01
23	0.443	0.1477E-02	0.5867E-02	0.1169E-02	0.3111E-02	0.3282E+01	0.1475E+01
24	0.471	0.1697E-02	0.6444E-02	0.1276E-02	0.3257E-02	0.3592E+01	0.1810E+01
25	0.499	0.1934E-02	0.6795E-02	0.1387E-02	0.3376E-02	0.3881E+01	0.2112E+01
26	0.527	0.2162E-02	0.6451E-02	0.1501E-02	0.3413E-02	0.4166E+01	0.2376E+01
27	0.556	0.2360E-02	0.5707E-02	0.1623E-02	0.3462E-02	0.4447E+01	0.2613E+01
28	0.585	0.2524E-02	0.4780E-02	0.1746E-02	0.3625E-02	0.4697E+01	0.2801E+01
29	0.614	0.2659E-02	0.3954E-02	0.1874E-02	0.3766E-02	0.4913E+01	0.2963E+01
30	0.644	0.2778E-02	0.3576E-02	0.2007E-02	0.3902E-02	0.5070E+01	0.3091E+01
31	0.674	0.2903E-02	0.3999E-02	0.2146E-02	0.4044E-02	0.5149E+01	0.3186E+01
32	0.704	0.3040E-02	0.4250E-02	0.2291E-02	0.4188E-02	0.5211E+01	0.3254E+01
33	0.734	0.3189E-02	0.4613E-02	0.2442E-02	0.4667E-02	0.5234E+01	0.3270E+01
34	0.763	0.3353E-02	0.5154E-02	0.2602E-02	0.4798E-02	0.5213E+01	0.3272E+01
35	0.793	0.3534E-02	0.5845E-02	0.2770E-02	0.5239E-02	0.5174E+01	0.3247E+01
36	0.821	0.3736E-02	0.6889E-02	0.2945E-02	0.5909E-02	0.5114E+01	0.3208E+01
37	0.848	0.3954E-02	0.7981E-02	0.3138E-02	0.6867E-02	0.5054E+01	0.3156E+01
38	0.874	0.4200E-02	0.9608E-02	0.3345E-02	0.8156E-02	0.4963E+01	0.3083E+01
39	0.897	0.4465E-02	0.1163E-01	0.3581E-02	0.9921E-02	0.4895E+01	0.3032E+01
40	0.919	0.4763E-02	0.1393E-01	0.3840E-02	0.1210E-01	0.4759E+01	0.2914E+01
41	0.940	0.5095E-02	0.1685E-01	0.4143E-02	0.1469E-01	0.4601E+01	0.2780E+01
42	0.960	0.5475E-02	0.2007E-01	0.4498E-02	0.1803E-01	0.4396E+01	0.2780E+01
43	0.980	0.5919E-02	0.2394E-01	0.4926E-02	0.2252E-01	0.4169E+01	0.2780E+01
44	1.000	0.6447E-02	0.2781E-01	0.5441E-02	0.2720E-01	0.3939E+01	0.2780E+01

NEW DISPLACEMENT THICKNESS
AT STATION 25

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3677E-04	0.1762E-04	0.4421E-04	-0.1096E-03	-0.4800E+02	-0.4995E+02
2	0.012	0.4217E-04	0.9888E-03	0.4837E-04	0.9213E-03	-0.2679E+02	-0.2875E+02
3	0.020	0.5396E-04	0.1233E-02	0.5916E-04	0.9585E-03	-0.2016E+02	-0.2210E+02
4	0.028	0.7034E-04	0.2037E-02	0.7216E-04	0.1602E-02	-0.1651E+02	-0.1645E+02
5	0.037	0.9448E-04	0.2628E-02	0.9040E-04	0.1891E-02	-0.1407E+02	-0.1599E+02
6	0.046	0.1218E-03	0.1990E-02	0.1095E-03	0.1417E-02	-0.1215E+02	-0.1408E+02
7	0.056	0.1127E-03	-0.2480E-02	0.1056E-03	-0.1446E-02	-0.1037E+02	-0.1239E+02
8	0.067	0.1408E-03	0.3902E-02	0.1314E-03	0.3409E-02	-0.9415E+01	-0.1135E+02
9	0.080	0.1783E-03	0.1736E-02	0.1687E-03	0.1731E-02	-0.8100E+01	-0.1006E+02
10	0.095	0.2166E-03	0.2602E-02	0.2011E-03	0.2229E-02	-0.7042E+01	-0.8982E+01
11	0.112	0.2588E-03	0.2047E-02	0.2379E-03	0.1804E-02	-0.5950E+01	-0.7898E+01
12	0.133	0.3134E-03	0.1680E-02	0.2859E-03	0.1470E-02	-0.4910E+01	-0.6859E+01
13	0.156	0.3726E-03	0.1965E-02	0.3404E-03	0.1509E-02	-0.3935E+01	-0.5870E+01
14	0.183	0.4434E-03	0.2154E-02	0.4033E-03	0.1723E-02	-0.2998E+01	-0.4934E+01
15	0.212	0.5208E-03	0.2251E-02	0.4742E-03	0.2048E-02	-0.2095E+01	-0.4045E+01
16	0.242	0.6054E-03	0.2498E-02	0.5519E-03	0.2347E-02	-0.1246E+01	-0.3199E+01
17	0.272	0.6962E-03	0.2778E-02	0.6341E-03	0.2435E-02	-0.4114E+00	-0.2353E+01
18	0.301	0.7907E-03	0.2560E-02	0.7172E-03	0.2426E-02	0.5745E+00	-0.1379E+01
19	0.330	0.8945E-03	0.3072E-02	0.8034E-03	0.2440E-02	0.1401E+01	-0.5249E+00
20	0.359	0.1016E-02	0.3445E-02	0.8949E-03	0.2684E-02	0.2030E+01	0.1122E+00
21	0.387	0.1159E-02	0.4449E-02	0.9908E-03	0.2812E-02	0.2501E+01	0.6319E+00
22	0.415	0.1339E-02	0.5571E-02	0.1095E-02	0.3082E-02	0.2895E+01	0.1073E+01
23	0.443	0.1552E-02	0.6531E-02	0.1201E-02	0.3286E-02	0.3244E+01	0.1465E+01
24	0.471	0.1792E-02	0.7215E-02	0.1312E-02	0.3409E-02	0.3548E+01	0.1801E+01
25	0.499	0.2038E-02	0.7132E-02	0.1427E-02	0.3469E-02	0.3862E+01	0.2106E+01
26	0.527	0.2273E-02	0.6541E-02	0.1546E-02	0.3536E-02	0.4161E+01	0.2369E+01
27	0.556	0.2460E-02	0.5191E-02	0.1669E-02	0.3695E-02	0.4476E+01	0.2600E+01
28	0.585	0.2601E-02	0.4265E-02	0.1794E-02	0.3807E-02	0.4726E+01	0.2791E+01
29	0.614	0.2713E-02	0.3510E-02	0.1924E-02	0.3861E-02	0.4938E+01	0.2957E+01
30	0.644	0.2813E-02	0.3252E-02	0.2059E-02	0.3947E-02	0.5089E+01	0.3089E+01
31	0.674	0.2928E-02	0.3658E-02	0.2201E-02	0.4129E-02	0.5169E+01	0.3181E+01
32	0.704	0.3056E-02	0.3982E-02	0.2347E-02	0.4379E-02	0.5227E+01	0.3243E+01
33	0.734	0.3199E-02	0.4448E-02	0.2503E-02	0.4482E-02	0.5243E+01	0.3280E+01
34	0.763	0.3360E-02	0.4982E-02	0.2667E-02	0.4859E-02	0.5223E+01	0.3269E+01
35	0.793	0.3539E-02	0.5706E-02	0.2836E-02	0.5309E-02	0.5182E+01	0.3244E+01
36	0.821	0.3739E-02	0.6765E-02	0.3014E-02	0.5970E-02	0.5121E+01	0.3204E+01
37	0.848	0.3960E-02	0.7858E-02	0.3209E-02	0.6844E-02	0.5061E+01	0.3157E+01
38	0.874	0.4207E-02	0.9647E-02	0.3418E-02	0.8241E-02	0.4961E+01	0.3079E+01
39	0.897	0.4482E-02	0.1160E-01	0.3658E-02	0.9972E-02	0.4923E+01	0.3049E+01
40	0.919	0.4793E-02	0.1436E-01	0.3923E-02	0.1222E-01	0.4796E+01	0.2940E+01
41	0.940	0.5143E-02	0.1714E-01	0.4231E-02	0.1473E-01	0.4648E+01	0.2815E+01
42	0.960	0.5554E-02	0.2066E-01	0.4597E-02	0.1763E-01	0.4463E+01	0.2815E+01
43	0.980	0.6039E-02	0.2553E-01	0.5037E-02	0.2247E-01	0.4260E+01	0.2815E+01
44	1.000	0.6628E-02	0.3041E-01	0.5569E-02	0.2721E-01	0.3793E+01	0.2815E+01

NEW DISPLACEMENT THICKNESS
AT STATION 26

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3764E-04	0.2395E-04	0.4511E-04	-0.1057E-03	-0.4800E+02	-0.4995E+02
2	0.012	0.4327E-04	0.1024E-02	0.4945E-04	0.9528E-03	-0.2679E+02	-0.2875E+02
3	0.020	0.5548E-04	0.1285E-02	0.6062E-04	0.1003E-02	-0.2016E+02	-0.2211E+02
4	0.028	0.7255E-04	0.2124E-02	0.7420E-04	0.1679E-02	-0.1652E+02	-0.1845E+02
5	0.037	0.9776E-04	0.2751E-02	0.9335E-04	0.1996E-02	-0.1407E+02	-0.1599E+02
6	0.046	0.1263E-03	0.2083E-02	0.1135E-03	0.1491E-02	-0.1216E+02	-0.1408E+02
7	0.056	0.1149E-03	-0.2776E-02	0.1084E-03	-0.1666E-02	-0.1036E+02	-0.1238E+02
8	0.067	0.1446E-03	0.3670E-02	0.1342E-03	0.3482E-02	-0.9402E+01	-0.1135E+02
9	0.080	0.1810E-03	0.2152E-02	0.1722E-03	0.1754E-02	-0.8123E+01	-0.1006E+02
10	0.095	0.2212E-03	0.2601E-02	0.2050E-03	0.2443E-02	-0.7042E+01	-0.8994E+01
11	0.112	0.2644E-03	0.2143E-02	0.2422E-03	0.1836E-02	-0.5956E+01	-0.7900E+01
12	0.133	0.3166E-03	0.1915E-02	0.2908E-03	0.1546E-02	-0.4923E+01	-0.6863E+01
13	0.156	0.3789E-03	0.2028E-02	0.3460E-03	0.1621E-02	-0.3938E+01	-0.5876E+01
14	0.183	0.4508E-03	0.2116E-02	0.4099E-03	0.1784E-02	-0.2995E+01	-0.4938E+01
15	0.212	0.5305E-03	0.2245E-02	0.4826E-03	0.2072E-02	-0.2095E+01	-0.4046E+01
16	0.242	0.6185E-03	0.2819E-02	0.5627E-03	0.2425E-02	-0.1264E+01	-0.3203E+01
17	0.272	0.7149E-03	0.2879E-02	0.6493E-03	0.2592E-02	-0.4171E+00	-0.2362E+01
18	0.301	0.8225E-03	0.3155E-02	0.7376E-03	0.2426E-02	0.5410E+00	-0.1379E+01
19	0.330	0.9433E-03	0.3181E-02	0.8293E-03	0.2640E-02	0.1395E+01	-0.5361E+00
20	0.359	0.1087E-02	0.4367E-02	0.9271E-03	0.2794E-02	0.1979E+01	0.1060E+00
21	0.387	0.1264E-02	0.5100E-02	0.1029E-02	0.2986E-02	0.2464E+01	0.6222E+00
22	0.415	0.1480E-02	0.6426E-02	0.1138E-02	0.3333E-02	0.2847E+01	0.1059E+01
23	0.443	0.1727E-02	0.7281E-02	0.1248E-02	0.3420E-02	0.3202E+01	0.1458E+01
24	0.471	0.1979E-02	0.7240E-02	0.1363E-02	0.3528E-02	0.3547E+01	0.1794E+01
25	0.499	0.2207E-02	0.6168E-02	0.1480E-02	0.3624E-02	0.3916E+01	0.2098E+01
26	0.527	0.2389E-02	0.4945E-02	0.1602E-02	0.3689E-02	0.4251E+01	0.2361E+01
27	0.556	0.2517E-02	0.3970E-02	0.1728E-02	0.3933E-02	0.4545E+01	0.2586E+01
28	0.585	0.2610E-02	0.3112E-02	0.1856E-02	0.3906E-02	0.4791E+01	0.2786E+01
29	0.614	0.2695E-02	0.2882E-02	0.1990E-02	0.3958E-02	0.4973E+01	0.2952E+01
30	0.644	0.2784E-02	0.2927E-02	0.2128E-02	0.3958E-02	0.5107E+01	0.3088E+01
31	0.674	0.2895E-02	0.3483E-02	0.2270E-02	0.4176E-02	0.5178E+01	0.3179E+01
32	0.704	0.3024E-02	0.3932E-02	0.2420E-02	0.4322E-02	0.5229E+01	0.3246E+01
33	0.734	0.3168E-02	0.4364E-02	0.2576E-02	0.4430E-02	0.5248E+01	0.3283E+01
34	0.763	0.3329E-02	0.4899E-02	0.2738E-02	0.4875E-02	0.5227E+01	0.3268E+01
35	0.793	0.3505E-02	0.5658E-02	0.2904E-02	0.5236E-02	0.5185E+01	0.3248E+01
36	0.821	0.3698E-02	0.6443E-02	0.3080E-02	0.5812E-02	0.5139E+01	0.3213E+01
37	0.848	0.3911E-02	0.7787E-02	0.3268E-02	0.6745E-02	0.5065E+01	0.3163E+01
38	0.874	0.4155E-02	0.9356E-02	0.3482E-02	0.8162E-02	0.4977E+01	0.3083E+01
39	0.897	0.4423E-02	0.1121E-01	0.3713E-02	0.9652E-02	0.4960E+01	0.3074E+01
40	0.919	0.4735E-02	0.1401E-01	0.3987E-02	0.1218E-01	0.4845E+01	0.2978E+01
41	0.940	0.5088E-02	0.1666E-01	0.4295E-02	0.1458E-01	0.4710E+01	0.2865E+01
42	0.960	0.5509E-02	0.2013E-01	0.4667E-02	0.1744E-01	0.4547E+01	0.2865E+01
43	0.980	0.6013E-02	0.2475E-01	0.5117E-02	0.2102E-01	0.4370E+01	0.2865E+01
44	1.000	0.6635E-02	0.2936E-01	0.5664E-02	0.2736E-01	0.3852E+01	0.2865E+01

NEW DISPLACEMENT THICKNESS
AT STATION 27

J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3843E-04	0.3360E-04	0.4548E-04	-0.9374E-04	-0.4799E+02	-0.4995E+02
2	0.012	0.4436E-04	0.1064E-02	0.5008E-04	0.9893E-03	-0.2679E+02	-0.2875E+02
3	0.020	0.5704E-04	0.1348E-02	0.6172E-04	0.1066E-02	-0.2017E+02	-0.2211E+02
4	0.028	0.7489E-04	0.2222E-02	0.7615E-04	0.1786E-02	-0.1652E+02	-0.1846E+02
5	0.037	0.1012E-03	0.2682E-02	0.9665E-04	0.2146E-02	-0.1408E+02	-0.1600E+02
6	0.046	0.1310E-03	0.2182E-02	0.1184E-03	0.1597E-02	-0.1216E+02	-0.1409E+02
7	0.056	0.1197E-03	-0.2956E-02	0.1114E-03	-0.1992E-02	-0.1035E+02	-0.1236E+02
8	0.067	0.1477E-03	0.3910E-02	0.1374E-03	0.3488E-02	-0.9416E+01	-0.1135E+02
9	0.080	0.1854E-03	0.2210E-02	0.1762E-03	0.1830E-02	-0.8126E+01	-0.1007E+02
10	0.095	0.2264E-03	0.2666E-02	0.2098E-03	0.2501E-02	-0.7046E+01	-0.8998E+01
11	0.112	0.2711E-03	0.2217E-02	0.2486E-03	0.1912E-02	-0.5960E+01	-0.7904E+01
12	0.133	0.3254E-03	0.2025E-02	0.2986E-03	0.1730E-02	-0.4929E+01	-0.6874E+01
13	0.156	0.3907E-03	0.2102E-02	0.3559E-03	0.1809E-02	-0.3942E+01	-0.5887E+01
14	0.183	0.4682E-03	0.2097E-02	0.4231E-03	0.1888E-02	-0.2994E+01	-0.4944E+01
15	0.212	0.5570E-03	0.2537E-02	0.5007E-03	0.2205E-02	-0.2111E+01	-0.4053E+01
16	0.242	0.6586E-03	0.3256E-02	0.5866E-03	0.2591E-02	-0.1289E+01	-0.3212E+01
17	0.272	0.7770E-03	0.3581E-02	0.6804E-03	0.2731E-02	-0.4566E+00	-0.2370E+01
18	0.301	0.9129E-03	0.3920E-02	0.7778E-03	0.2814E-02	0.4980E+00	-0.1401E+01
19	0.330	0.1071E-02	0.4672E-02	0.8768E-03	0.2795E-02	0.1311E+01	-0.5448E+00
20	0.359	0.1258E-02	0.5473E-02	0.9806E-03	0.3090E-02	0.1916E+01	0.8937E-01
21	0.387	0.1464E-02	0.6178E-02	0.1088E-02	0.3170E-02	0.2404E+01	0.6118E+00
22	0.415	0.1687E-02	0.6222E-02	0.1200E-02	0.3453E-02	0.2858E+01	0.1052E+01
23	0.443	0.1891E-02	0.5838E-02	0.1314E-02	0.3570E-02	0.3283E+01	0.1450E+01
24	0.471	0.2059E-02	0.4155E-02	0.1431E-02	0.3641E-02	0.3720E+01	0.1788E+01
25	0.499	0.2186E-02	0.3801E-02	0.1551E-02	0.3718E-02	0.4049E+01	0.2092E+01
26	0.527	0.2284E-02	0.3117E-02	0.1674E-02	0.3789E-02	0.4354E+01	0.2355E+01
27	0.556	0.2366E-02	0.2761E-02	0.1801E-02	0.3992E-02	0.4613E+01	0.2583E+01
28	0.585	0.2449E-02	0.2704E-02	0.1932E-02	0.3915E-02	0.4814E+01	0.2785E+01
29	0.614	0.2543E-02	0.2919E-02	0.2064E-02	0.3869E-02	0.4971E+01	0.2957E+01
30	0.644	0.2650E-02	0.3162E-02	0.2199E-02	0.3726E-02	0.5093E+01	0.3101E+01
31	0.674	0.2772E-02	0.3695E-02	0.2336E-02	0.3922E-02	0.5167E+01	0.3193E+01
32	0.704	0.2910E-02	0.3988E-02	0.2479E-02	0.4056E-02	0.5226E+01	0.3261E+01
33	0.734	0.3056E-02	0.4326E-02	0.2625E-02	0.4179E-02	0.5250E+01	0.3297E+01
34	0.763	0.3210E-02	0.4751E-02	0.2775E-02	0.4659E-02	0.5236E+01	0.3280E+01
35	0.793	0.3376E-02	0.5289E-02	0.2929E-02	0.4888E-02	0.5206E+01	0.3267E+01
36	0.821	0.3553E-02	0.6075E-02	0.3095E-02	0.5551E-02	0.5160E+01	0.3228E+01
37	0.848	0.3750E-02	0.7212E-02	0.3272E-02	0.6345E-02	0.5098E+01	0.3185E+01
38	0.874	0.3976E-02	0.8692E-02	0.3469E-02	0.7609E-02	0.5014E+01	0.3114E+01
39	0.897	0.4227E-02	0.1022E-01	0.3700E-02	0.9271E-02	0.5003E+01	0.3105E+01
40	0.919	0.4518E-02	0.1270E-01	0.3956E-02	0.1099E-01	0.4903E+01	0.3025E+01
41	0.940	0.4861E-02	0.1507E-01	0.4262E-02	0.1352E-01	0.4783E+01	0.2926E+01
42	0.960	0.5267E-02	0.1622E-01	0.4622E-02	0.1597E-01	0.4644E+01	0.2926E+01
43	0.980	0.5762E-02	0.2196E-01	0.5064E-02	0.1960E-01	0.4495E+01	0.2926E+01
44	1.000	0.6377E-02	0.2570E-01	0.5592E-02	0.2325E-01	0.4058E+01	0.2926E+01

NEW DISPLACEMENT THICKNESS
AT STATION 26

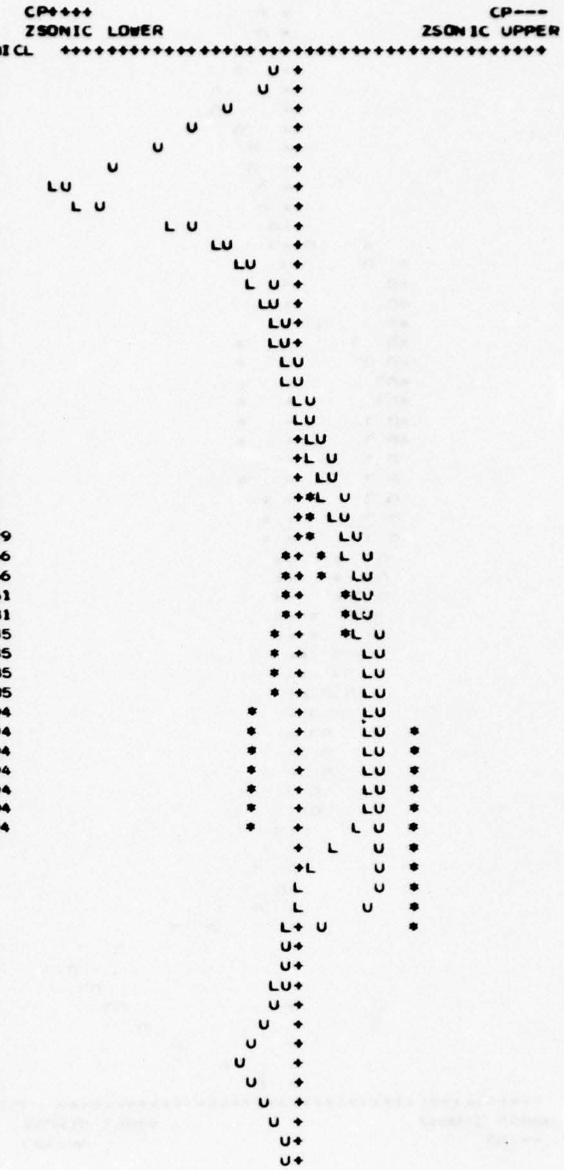
J	X/C	D-TOP	ACT-SLP	D-BOT	ACT-SLP	WBCU	WBCL
1	0.004	0.3861E-04	0.6187E-04	0.4436E-04	-0.5362E-04	-0.4799E+02	-0.4995E+02
2	0.012	0.4511E-04	0.1128E-02	0.4953E-04	0.1046E-02	-0.2680E+02	-0.2875E+02
3	0.020	0.5860E-04	0.1470E-02	0.6197E-04	0.1197E-02	-0.2017E+02	-0.2212E+02
4	0.028	0.7804E-04	0.2418E-02	0.7821E-04	0.2009E-02	-0.1653E+02	-0.1847E+02
5	0.037	0.1071E-03	0.3196E-02	0.1019E-03	0.2516E-02	-0.1410E+02	-0.1602E+02
6	0.046	0.1406E-03	0.2462E-02	0.1281E-03	0.1884E-02	-0.1218E+02	-0.1411E+02
7	0.056	0.1253E-03	-0.3696E-02	0.1174E-03	-0.2663E-02	-0.1030E+02	-0.1232E+02
8	0.067	0.1549E-03	0.4054E-02	0.1473E-03	0.3739E-02	-0.9424E+01	-0.1137E+02
9	0.080	0.1953E-03	0.2344E-02	0.1833E-03	0.2027E-02	-0.8134E+01	-0.1008E+02
10	0.095	0.2396E-03	0.3089E-02	0.2248E-03	0.2726E-02	-0.7070E+01	-0.9010E+01
11	0.112	0.2885E-03	0.2429E-02	0.2656E-03	0.2017E-02	-0.5972E+01	-0.7910E+01
12	0.133	0.3487E-03	0.2255E-02	0.3179E-03	0.1780E-02	-0.4942E+01	-0.6876E+01
13	0.156	0.4236E-03	0.2218E-02	0.3804E-03	0.1984E-02	-0.3949E+01	-0.5897E+01
14	0.183	0.5135E-03	0.2513E-02	0.4544E-03	0.2119E-02	-0.3018E+01	-0.4957E+01
15	0.212	0.6214E-03	0.3098E-02	0.5406E-03	0.2385E-02	-0.2143E+01	-0.4063E+01
16	0.242	0.7475E-03	0.3720E-02	0.6354E-03	0.2839E-02	-0.1315E+01	-0.3226E+01
17	0.272	0.8896E-03	0.4115E-02	0.7369E-03	0.2970E-02	-0.4866E+00	-0.2383E+01
18	0.301	0.1043E-02	0.4387E-02	0.8422E-03	0.3021E-02	0.4718E+00	-0.1412E+01
19	0.330	0.1201E-02	0.4689E-02	0.9475E-03	0.3124E-02	0.1310E+01	-0.5633E+00
20	0.359	0.1353E-02	0.4561E-02	0.1055E-02	0.3290E-02	0.1968E+01	0.7813E-01
21	0.387	0.1497E-02	0.4361E-02	0.1165E-02	0.3270E-02	0.2506E+01	0.6062E+00
22	0.415	0.1621E-02	0.3652E-02	0.1276E-02	0.3413E-02	0.3002E+01	0.1055E+01
23	0.443	0.1727E-02	0.3122E-02	0.1387E-02	0.3408E-02	0.3436E+01	0.1459E+01
24	0.471	0.1821E-02	0.2781E-02	0.1499E-02	0.3402E-02	0.3797E+01	0.1801E+01
25	0.499	0.1910E-02	0.2727E-02	0.1613E-02	0.3389E-02	0.4109E+01	0.2111E+01
26	0.527	0.2002E-02	0.2877E-02	0.1728E-02	0.3440E-02	0.4367E+01	0.2375E+01
27	0.556	0.2096E-02	0.2833E-02	0.1844E-02	0.3557E-02	0.4609E+01	0.2607E+01
28	0.585	0.2196E-02	0.2921E-02	0.1961E-02	0.3370E-02	0.4802E+01	0.2816E+01
29	0.614	0.2303E-02	0.3109E-02	0.2079E-02	0.3324E-02	0.4961E+01	0.2988E+01
30	0.644	0.2417E-02	0.3289E-02	0.2196E-02	0.3361E-02	0.5087E+01	0.3122E+01
31	0.674	0.2535E-02	0.3387E-02	0.2315E-02	0.3413E-02	0.5184E+01	0.3221E+01
32	0.704	0.2657E-02	0.3609E-02	0.2436E-02	0.3499E-02	0.5247E+01	0.3293E+01
33	0.734	0.2781E-02	0.3734E-02	0.2559E-02	0.3650E-02	0.5283E+01	0.3327E+01
34	0.763	0.2912E-02	0.4188E-02	0.2682E-02	0.3859E-02	0.5267E+01	0.3325E+01
35	0.793	0.3047E-02	0.4478E-02	0.2813E-02	0.4340E-02	0.5251E+01	0.3298E+01
36	0.821	0.3191E-02	0.4998E-02	0.2953E-02	0.4645E-02	0.5220E+01	0.3279E+01
37	0.848	0.3349E-02	0.5775E-02	0.3103E-02	0.5238E-02	0.5178E+01	0.3248E+01
38	0.874	0.3531E-02	0.6835E-02	0.3269E-02	0.6007E-02	0.5119E+01	0.3204E+01
39	0.897	0.3743E-02	0.8016E-02	0.3459E-02	0.7105E-02	0.5050E+01	0.3140E+01
40	0.919	0.3985E-02	0.9205E-02	0.3678E-02	0.8183E-02	0.4967E+01	0.3077E+01
41	0.940	0.4263E-02	0.1094E-01	0.3921E-02	0.9329E-02	0.4863E+01	0.2995E+01
42	0.960	0.4602E-02	0.1314E-01	0.4209E-02	0.1115E-01	0.4750E+01	0.2995E+01
43	0.980	0.5010E-02	0.1538E-01	0.4552E-02	0.1277E-01	0.4631E+01	0.2995E+01
44	1.000	0.5515E-02	0.1763E-01	0.4964E-02	0.1559E-01	0.4512E+01	0.2995E+01

POTENTIAL JUMP AT TRAILING EDGE

0.5439E-01	0.5414E-01	0.5435E-01	0.5326E-01	0.5188E-01	0.5054E-01
0.5016E-01	0.4984E-01	0.4931E-01	0.4836E-01	0.4731E-01	0.4618E-01
0.4504E-01	0.4408E-01	0.4304E-01	0.4201E-01	0.4099E-01	0.3994E-01
0.3872E-01	0.3756E-01	0.3624E-01	0.3475E-01	0.3298E-01	0.3080E-01
0.2803E-01	0.2461E-01	0.2023E-01	0.1392E-01		

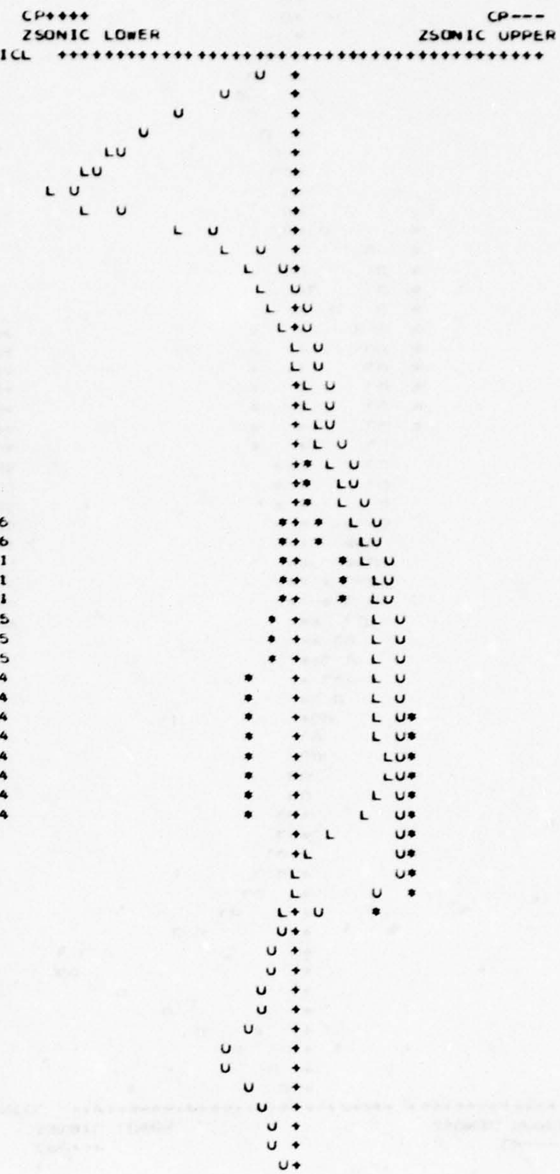
K= 1 SPAN STATION ETA= 0.0 Y= 0.0

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.5055	-0.2013	0.09263	0.09255	0.857	0.857	-0.000	0.0	0.0
3	-0.3781	-0.0861	0.18200	0.18203	0.802	0.802	0.000	0.0	0.0
4	-0.3354	-0.0502	0.31160	0.31209	0.715	0.715	0.000	0.0	0.0
5	-0.3154	-0.0323	0.48102	0.48425	0.582	0.579	0.003	0.0	0.0
6	-0.3027	-0.0210	0.66723	0.67860	0.386	0.371	0.011	0.0	0.0
7	-0.2926	-0.0121	0.87772	0.90651	0.032	0.032	0.029	0.0	0.0
8	-0.2835	-0.0040	1.13621	1.19756	0.032	0.032	0.061	0.0	0.0
9	-0.2745	0.0040	0.96508	1.05431	0.032	0.032	0.089	0.0	0.0
10	-0.2655	0.0120	0.51407	0.61071	0.552	0.455	0.097	0.0	0.0
11	-0.2564	0.0201	0.30724	0.40274	0.718	0.647	0.095	0.0	0.0
12	-0.2471	0.0283	0.19506	0.28653	0.793	0.733	0.091	0.0	0.0
13	-0.2374	0.0369	0.12953	0.21646	0.834	0.780	0.087	0.0	0.0
14	-0.2271	0.0461	0.08772	0.17065	0.860	0.809	0.083	0.0	0.0
15	-0.2159	0.0561	0.05732	0.13712	0.877	0.830	0.080	0.0	0.0
16	-0.2034	0.0672	0.02864	0.10623	0.894	0.849	0.078	0.0	0.0
17	-0.1891	0.0799	0.00099	0.07651	0.909	0.866	0.076	0.0	0.0
18	-0.1725	0.0947	-0.02541	0.04898	0.924	0.882	0.074	0.0	0.0
19	-0.1529	0.1121	-0.05429	0.01928	0.940	0.899	0.074	0.0	0.0
20	-0.1298	0.1326	-0.08294	-0.01065	0.955	0.916	0.072	0.0	0.0
21	-0.1031	0.1564	-0.11174	-0.04035	0.970	0.932	0.071	0.0	0.0
22	-0.0730	0.1831	-0.14257	-0.07213	0.986	0.949	0.070	0.0	0.0
23	-0.0405	0.2120	-0.17478	-0.10452	1.003	0.967	0.070	0.0	0.0
24	-0.0068	0.2419	-0.20725	-0.13742	1.019	0.984	0.070	0.066	0.0
25	0.0269	0.2719	-0.24474	-0.17793	1.038	1.005	0.067	0.131	0.0
26	0.0601	0.3014	-0.28313	-0.21876	1.056	1.025	0.064	0.131	-0.029
27	0.0926	0.3303	-0.31029	-0.24563	1.069	1.038	0.065	0.235	-0.066
28	0.1245	0.3587	-0.32833	-0.26295	1.078	1.047	0.065	0.235	-0.066
29	0.1561	0.3867	-0.34261	-0.27657	1.085	1.053	0.066	0.394	-0.131
30	0.1875	0.4146	-0.35524	-0.28859	1.091	1.059	0.067	0.394	-0.131
31	0.2188	0.4425	-0.36587	-0.29871	1.096	1.064	0.067	0.394	-0.235
32	0.2503	0.4705	-0.37471	-0.30709	1.100	1.068	0.068	0.631	-0.235
33	0.2821	0.4987	-0.38234	-0.31389	1.103	1.071	0.068	0.631	-0.235
34	0.3141	0.5272	-0.38870	-0.31880	1.106	1.074	0.070	0.631	-0.235
35	0.3464	0.5559	-0.39370	-0.32174	1.108	1.075	0.072	0.631	-0.394
36	0.3791	0.5850	-0.39733	-0.32314	1.110	1.076	0.074	0.973	-0.394
37	0.4121	0.6143	-0.39976	-0.32567	1.111	1.077	0.074	0.973	-0.394
38	0.4454	0.6439	-0.40056	-0.33317	1.112	1.080	0.067	0.973	-0.394
39	0.4789	0.6737	-0.39915	-0.34178	1.111	1.084	0.057	0.973	-0.394
40	0.5126	0.7037	-0.39438	-0.33205	1.109	1.080	0.062	0.973	-0.394
41	0.5464	0.7336	-0.38840	-0.27383	1.106	1.052	0.115	0.973	-0.394
42	0.5798	0.7634	-0.38986	-0.15237	1.107	0.992	0.237	0.973	0.0
43	0.6128	0.7927	-0.40300	-0.05709	1.113	0.941	0.346	0.973	0.0
44	0.6447	0.8211	-0.40465	-0.02317	1.113	0.923	0.381	0.973	0.0
45	0.6751	0.8481	-0.34327	0.00478	1.085	0.907	0.348	0.973	0.0
46	0.7037	0.8735	-0.13398	0.03096	0.982	0.893	0.165	0.973	0.0
47	0.7304	0.8972	0.03376	0.05592	0.891	0.878	0.022	0.0	0.0
48	0.7552	0.9193	0.05809	0.07296	0.877	0.868	0.015	0.0	0.0
49	0.7787	0.9401	0.08261	0.08813	0.863	0.859	0.006	0.0	0.0
50	0.8013	0.9603	0.11097	0.11324	0.846	0.844	0.002	0.0	0.0
51	0.8237	0.9801	0.15316	0.15392	0.820	0.819	0.001	0.0	0.0
52	0.8460	1.0000	0.24265	0.24230	0.762	0.763	-0.000	0.0	0.0
53	0.8690	1.0204	0.26512	0.26464	0.747	0.748	-0.000	0.0	0.0
54	0.8965	1.0449	0.20200	0.20196	0.789	0.789	-0.000	0.0	0.0
55	0.9389	1.0826	0.15803	0.15802	0.817	0.817	-0.000	0.0	0.0
56	1.0180	1.1529	0.11626	0.11625	0.843	0.843	-0.000	0.0	0.0
57	1.1501	1.2703	0.08361	0.08352	0.862	0.862	0.000	0.0	0.0
58	1.2936	1.3979	0.06398	0.05834	0.873	0.877	-0.006	0.0	0.0



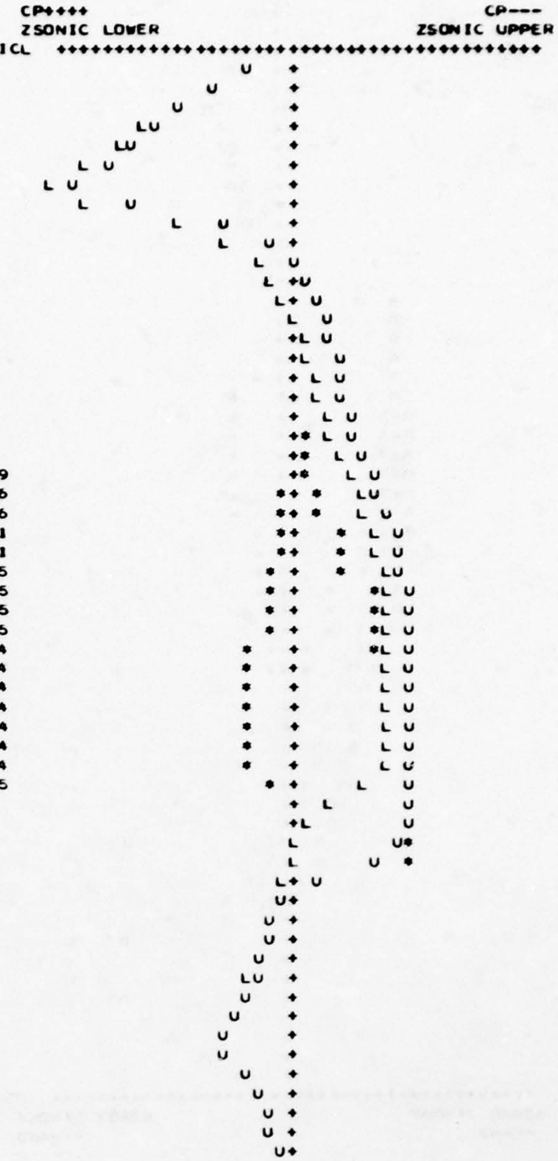
K= 2   SPAN STATION   ETA= 0.03636   Y= 0.08182

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.4392	-0.2013	0.12817	0.12808	0.835	0.835	-0.000	0.0	0.0
3	-0.3148	-0.0881	0.27552	0.27590	0.740	0.740	0.000	0.0	0.0
4	-0.2732	-0.0502	0.43948	0.44250	0.617	0.615	0.003	0.0	0.0
5	-0.2536	-0.0323	0.56673	0.57776	0.501	0.490	0.011	0.0	0.0
6	-0.2412	-0.0210	0.66778	0.69429	0.386	0.349	0.027	0.0	0.0
7	-0.2314	-0.0121	0.76261	0.81469	0.228	0.032	0.052	0.0	0.0
8	-0.2225	-0.0040	0.86425	0.95768	0.032	0.032	0.094	0.0	0.0
9	-0.2137	0.0040	0.67323	0.79986	0.378	0.120	0.127	0.0	0.0
10	-0.2050	0.0120	0.32014	0.45311	0.709	0.606	0.133	0.0	0.0
11	-0.1961	0.0201	0.15289	0.28128	0.820	0.736	0.128	0.0	0.0
12	-0.1870	0.0283	0.05997	0.18012	0.876	0.803	0.120	0.0	0.0
13	-0.1776	0.0369	0.00543	0.11669	0.907	0.842	0.111	0.0	0.0
14	-0.1675	0.0461	-0.02880	0.07447	0.926	0.867	0.103	0.0	0.0
15	-0.1566	0.0561	-0.05269	0.04353	0.939	0.885	0.096	0.0	0.0
16	-0.1444	0.0672	-0.07396	0.01674	0.950	0.901	0.091	0.0	0.0
17	-0.1304	0.0799	-0.09343	-0.00705	0.961	0.914	0.086	0.0	0.0
18	-0.1142	0.0947	-0.11236	-0.02968	0.971	0.926	0.083	0.0	0.0
19	-0.0951	0.1121	-0.13289	-0.05319	0.981	0.939	0.080	0.0	0.0
20	-0.0726	0.1326	-0.15369	-0.07662	0.992	0.952	0.077	0.0	0.0
21	-0.0465	0.1564	-0.17648	-0.10146	1.004	0.965	0.075	0.0	0.0
22	-0.0171	0.1831	-0.20213	-0.12888	1.017	0.979	0.073	0.066	0.0
23	0.0146	0.2120	-0.23037	-0.15927	1.031	0.995	0.071	0.066	0.0
24	0.0474	0.2419	-0.26167	-0.19333	1.046	1.012	0.068	0.131	0.0
25	0.0803	0.2719	-0.29704	-0.23087	1.063	1.031	0.066	0.235	-0.066
26	0.1127	0.3014	-0.32865	-0.26298	1.078	1.047	0.066	0.235	-0.066
27	0.1445	0.3303	-0.34882	-0.28235	1.088	1.056	0.066	0.394	-0.131
28	0.1756	0.3587	-0.36134	-0.29398	1.093	1.062	0.067	0.394	-0.131
29	0.2064	0.3867	-0.37120	-0.30324	1.098	1.066	0.068	0.394	-0.131
30	0.2370	0.4146	-0.37983	-0.31139	1.102	1.070	0.068	0.631	-0.235
31	0.2676	0.4425	-0.38681	-0.31799	1.105	1.073	0.069	0.631	-0.235
32	0.2984	0.4705	-0.39272	-0.32304	1.108	1.076	0.070	0.631	-0.235
33	0.3293	0.4987	-0.39781	-0.32658	1.110	1.077	0.071	0.631	-0.394
34	0.3606	0.5272	-0.40183	-0.32882	1.112	1.078	0.073	0.631	-0.394
35	0.3921	0.5559	-0.40462	-0.33050	1.113	1.079	0.074	0.973	-0.394
36	0.4240	0.5850	-0.40598	-0.33339	1.114	1.080	0.073	0.973	-0.394
37	0.4562	0.6143	-0.40580	-0.33915	1.114	1.083	0.067	0.973	-0.394
38	0.4887	0.6439	-0.40344	-0.34216	1.113	1.085	0.061	0.973	-0.394
39	0.5214	0.6737	-0.39875	-0.32289	1.111	1.075	0.076	0.973	-0.394
40	0.5543	0.7037	-0.39436	-0.25628	1.109	1.043	0.138	0.973	-0.394
41	0.5872	0.7336	-0.39679	-0.14860	1.110	0.990	0.248	0.973	0.0
42	0.6199	0.7634	-0.40576	-0.05921	1.114	0.943	0.347	0.973	0.0
43	0.6520	0.7927	-0.39111	-0.01627	1.107	0.919	0.375	0.973	0.0
44	0.6832	0.8211	-0.29263	0.00909	1.061	0.905	0.302	0.973	0.0
45	0.7129	0.8481	-0.10796	0.03312	0.968	0.891	0.141	0.631	0.0
46	0.7408	0.8735	0.03449	0.05600	0.891	0.878	0.022	0.0	0.0
47	0.7668	0.8972	0.07896	0.07597	0.865	0.866	-0.003	0.0	0.0
48	0.7910	0.9193	0.09734	0.09601	0.854	0.855	-0.001	0.0	0.0
49	0.8139	0.9401	0.12040	0.11992	0.840	0.840	-0.000	0.0	0.0
50	0.8360	0.9603	0.14919	0.14885	0.822	0.823	-0.000	0.0	0.0
51	0.8578	0.9801	0.18926	0.18876	0.797	0.798	-0.001	0.0	0.0
52	0.8796	1.0000	0.25743	0.25732	0.752	0.753	-0.000	0.0	0.0
53	0.9020	1.0204	0.25865	0.25881	0.752	0.752	0.000	0.0	0.0
54	0.9289	1.0449	0.19144	0.19144	0.796	0.796	0.000	0.0	0.0
55	0.9702	1.0826	0.14712	0.14712	0.824	0.824	-0.000	0.0	0.0
56	1.0474	1.1529	0.10907	0.10907	0.847	0.847	-0.000	0.0	0.0
57	1.1764	1.2703	0.07951	0.07951	0.864	0.864	-0.000	0.0	0.0
58	1.3164	1.3979	0.06128	0.05524	0.875	0.879	-0.006	0.0	0.0



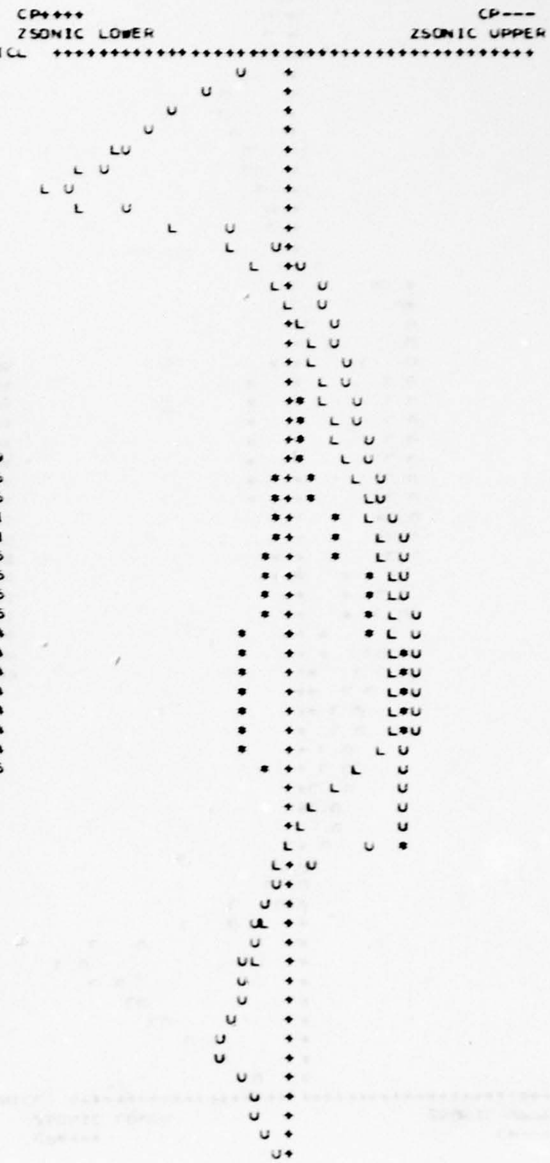
K= 3 SPAN STATION ETA= 0.07273 Y= 0.16364

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.3728	-0.2013	0.15122	0.15092	0.821	0.821	-0.000	0.0	0.0
3	-0.2516	-0.0881	0.29507	0.29563	0.727	0.726	0.001	0.0	0.0
4	-0.2110	-0.0502	0.42731	0.43136	0.627	0.624	0.004	0.0	0.0
5	-0.1919	-0.0323	0.52219	0.53617	0.545	0.532	0.014	0.0	0.0
6	-0.1798	-0.0210	0.60530	0.63784	0.461	0.423	0.033	0.0	0.0
7	-0.1702	-0.0121	0.69127	0.75377	0.353	0.247	0.062	0.0	0.0
8	-0.1615	-0.0040	0.79137	0.90163	0.151	0.032	0.110	0.0	0.0
9	-0.1530	0.0040	0.60415	0.75275	0.462	0.249	0.149	0.0	0.0
10	-0.1444	0.0120	0.25411	0.41077	0.755	0.640	0.157	0.0	0.0
11	-0.1358	0.0201	0.08698	0.23843	0.860	0.765	0.151	0.0	0.0
12	-0.1269	0.0283	-0.00622	0.13534	0.913	0.831	0.142	0.0	0.0
13	-0.1177	0.0369	-0.06058	0.07004	0.943	0.870	0.131	0.0	0.0
14	-0.1079	0.0461	-0.09399	0.02655	0.961	0.895	0.121	0.0	0.0
15	-0.0972	0.0561	-0.11599	-0.00486	0.973	0.913	0.111	0.0	0.0
16	-0.0853	0.0672	-0.13500	-0.03174	0.983	0.928	0.103	0.0	0.0
17	-0.0717	0.0799	-0.15256	-0.05519	0.992	0.940	0.097	0.0	0.0
18	-0.0559	0.0947	-0.16934	-0.07692	1.000	0.952	0.092	0.0	0.0
19	-0.0373	0.1121	-0.18744	-0.09943	1.009	0.964	0.088	0.029	0.0
20	-0.0153	0.1326	-0.20601	-0.12194	1.019	0.976	0.084	0.029	0.0
21	0.0101	0.1564	-0.22667	-0.14608	1.029	0.988	0.081	0.066	0.0
22	0.0388	0.1831	-0.25008	-0.17325	1.040	1.002	0.077	0.131	0.0
23	0.0697	0.2120	-0.27645	-0.20331	1.053	1.017	0.073	0.131	-0.029
24	0.1017	0.2419	-0.30587	-0.23565	1.067	1.033	0.070	0.235	-0.066
25	0.1338	0.2719	-0.33831	-0.26965	1.083	1.050	0.069	0.235	-0.066
26	0.1654	0.3014	-0.36651	-0.29777	1.096	1.064	0.069	0.394	-0.131
27	0.1963	0.3303	-0.38339	-0.31374	1.104	1.071	0.070	0.394	-0.131
28	0.2267	0.3587	-0.39260	-0.32212	1.108	1.075	0.070	0.394	-0.235
29	0.2567	0.3867	-0.39915	-0.32820	1.111	1.078	0.071	0.631	-0.235
30	0.2866	0.4146	-0.40464	-0.33327	1.113	1.080	0.071	0.631	-0.235
31	0.3164	0.4425	-0.40924	-0.33697	1.116	1.082	0.072	0.631	-0.235
32	0.3464	0.4705	-0.41290	-0.33932	1.117	1.083	0.074	0.631	-0.394
33	0.3766	0.4987	-0.41551	-0.34066	1.118	1.084	0.075	0.973	-0.394
34	0.4071	0.5272	-0.41723	-0.34214	1.119	1.085	0.075	0.973	-0.394
35	0.4379	0.5559	-0.41775	-0.34491	1.119	1.086	0.073	0.973	-0.394
36	0.4690	0.5850	-0.41652	-0.34899	1.119	1.088	0.068	0.973	-0.394
37	0.5004	0.6143	-0.41345	-0.34817	1.117	1.087	0.065	0.973	-0.394
38	0.5320	0.6439	-0.40849	-0.32252	1.115	1.075	0.086	0.973	-0.394
39	0.5639	0.6737	-0.40420	-0.24974	1.113	1.040	0.154	0.973	-0.235
40	0.5960	0.7037	-0.40640	-0.14460	1.114	0.988	0.262	0.973	0.0
41	0.6281	0.7336	-0.41317	-0.06211	1.117	0.944	0.351	0.973	0.0
42	0.6599	0.7634	-0.39077	-0.01925	1.107	0.921	0.372	0.973	0.0
43	0.6913	0.7927	-0.27554	0.00764	1.053	0.906	0.283	0.973	0.0
44	0.7217	0.8211	-0.09065	0.03035	0.959	0.893	0.121	0.0	0.0
45	0.7506	0.8481	0.03888	0.05358	0.888	0.880	0.015	0.0	0.0
46	0.7778	0.8735	0.08278	0.07847	0.862	0.865	-0.004	0.0	0.0
47	0.8032	0.8972	0.10131	0.10468	0.851	0.849	0.003	0.0	0.0
48	0.8268	0.9193	0.12009	0.13041	0.840	0.834	0.010	0.0	0.0
49	0.8491	0.9401	0.14055	0.14815	0.828	0.823	0.008	0.0	0.0
50	0.8707	0.9603	0.16392	0.16481	0.813	0.813	0.001	0.0	0.0
51	0.8919	0.9801	0.19556	0.19443	0.793	0.794	-0.001	0.0	0.0
52	0.9132	1.0000	0.25176	0.25102	0.756	0.757	-0.001	0.0	0.0
53	0.9350	1.0204	0.24818	0.24820	0.759	0.759	0.000	0.0	0.0
54	0.9613	1.0449	0.18381	0.18384	0.801	0.801	0.000	0.0	0.0
55	1.0016	1.0826	0.14094	0.14095	0.827	0.827	0.000	0.0	0.0
56	1.0769	1.1529	0.10471	0.10471	0.849	0.849	0.000	0.0	0.0
57	1.2026	1.2703	0.07672	0.07671	0.866	0.866	-0.000	0.0	0.0
58	1.3391	1.3979	0.06085	0.05165	0.875	0.881	-0.009	0.0	0.0



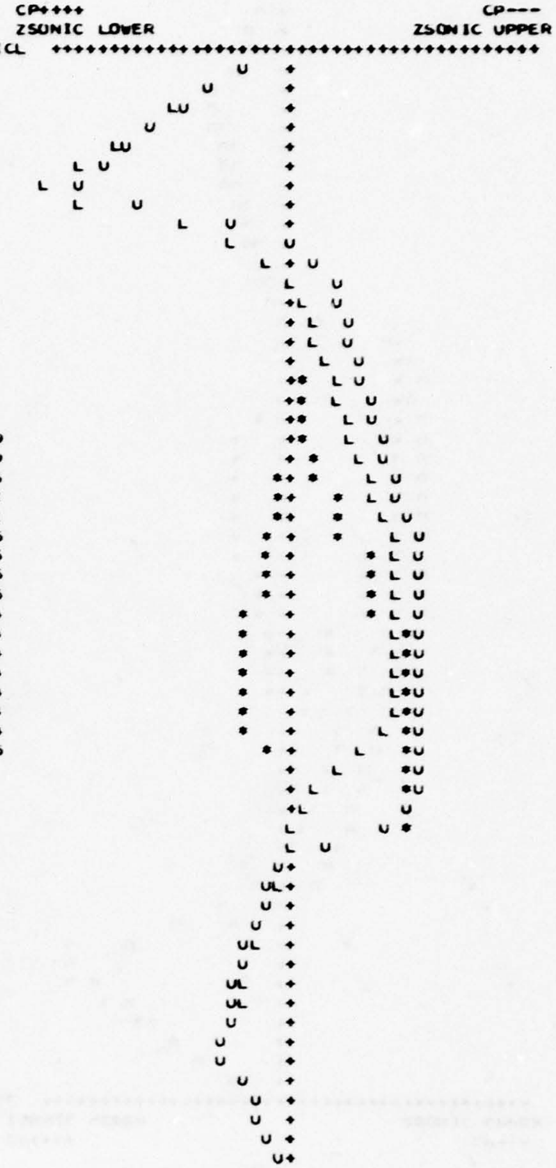
K= 4 SPAN STATION ETA= 0.10909 Y= 0.24545

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.3064	-0.2013	0.16005	0.15948	0.816	0.816	-0.001	0.0	0.0
3	-0.1663	-0.0861	0.28753	0.28821	0.732	0.731	0.001	0.0	0.0
4	-0.1467	-0.0502	0.39960	0.40439	0.649	0.645	0.005	0.0	0.0
5	-0.1301	-0.0323	0.48788	0.50407	0.576	0.561	0.016	0.0	0.0
6	-0.1183	-0.0210	0.56951	0.60648	0.499	0.459	0.037	0.0	0.0
7	-0.1090	-0.0121	0.65445	0.72434	0.403	0.302	0.070	0.0	0.0
8	-0.1005	-0.0040	0.75245	0.87402	0.250	0.032	0.122	0.0	0.0
9	-0.0922	0.0040	0.56428	0.72785	0.504	0.296	0.164	0.0	0.0
10	-0.0839	0.0120	0.21397	0.38742	0.781	0.659	0.173	0.0	0.0
11	-0.0754	0.0201	0.04516	0.21365	0.884	0.781	0.168	0.0	0.0
12	-0.0668	0.0283	-0.04961	0.10840	0.937	0.847	0.158	0.0	0.0
13	-0.0578	0.0369	-0.10500	0.04099	0.967	0.887	0.146	0.0	0.0
14	-0.0483	0.0461	-0.13895	-0.00427	0.985	0.912	0.135	0.0	0.0
15	-0.0379	0.0561	-0.16065	-0.03685	0.996	0.930	0.124	0.0	0.0
16	-0.0263	0.0672	-0.17955	-0.06466	1.005	0.945	0.115	0.0	0.0
17	-0.0130	0.0799	-0.19714	-0.08894	1.014	0.958	0.108	0.029	0.0
18	0.0024	0.0947	-0.21323	-0.11127	1.022	0.970	0.102	0.029	0.0
19	0.0206	0.1121	-0.23062	-0.13438	1.031	0.982	0.096	0.066	0.0
20	0.0419	0.1326	-0.24843	-0.15751	1.040	0.994	0.091	0.066	0.0
21	0.0667	0.1564	-0.26779	-0.18225	1.049	1.007	0.086	0.131	0.0
22	0.0946	0.1831	-0.28973	-0.20922	1.060	1.020	0.081	0.131	-0.029
23	0.1248	0.2120	-0.31470	-0.23815	1.072	1.035	0.077	0.235	-0.066
24	0.1560	0.2419	-0.34239	-0.26872	1.085	1.050	0.074	0.235	-0.066
25	0.1872	0.2719	-0.37288	-0.30058	1.099	1.065	0.072	0.394	-0.131
26	0.2180	0.3014	-0.39931	-0.32682	1.111	1.077	0.072	0.394	-0.131
27	0.2482	0.3303	-0.41453	-0.34095	1.118	1.084	0.074	0.394	-0.235
28	0.2778	0.3587	-0.42167	-0.34717	1.121	1.087	0.075	0.631	-0.235
29	0.3071	0.3867	-0.42589	-0.35086	1.123	1.089	0.075	0.631	-0.235
30	0.3361	0.4146	-0.42922	-0.35343	1.125	1.090	0.076	0.631	-0.235
31	0.3652	0.4425	-0.43154	-0.35466	1.126	1.090	0.077	0.631	-0.394
32	0.3945	0.4705	-0.43283	-0.35516	1.126	1.091	0.078	0.973	-0.394
33	0.4239	0.4987	-0.43341	-0.35605	1.127	1.091	0.077	0.973	-0.394
34	0.4536	0.5272	-0.43309	-0.35829	1.126	1.092	0.075	0.973	-0.394
35	0.4836	0.5559	-0.43128	-0.36107	1.126	1.093	0.070	0.973	-0.394
36	0.5139	0.5850	-0.42734	-0.35766	1.124	1.092	0.070	0.973	-0.394
37	0.5445	0.6143	-0.42185	-0.32813	1.121	1.078	0.094	0.973	-0.394
38	0.5753	0.6439	-0.41703	-0.25057	1.119	1.041	0.166	0.973	-0.235
39	0.6064	0.6737	-0.41805	-0.14457	1.120	0.988	0.273	0.973	0.0
40	0.6377	0.7037	-0.42355	-0.06588	1.122	0.946	0.358	0.973	0.0
41	0.6689	0.7336	-0.39978	-0.02565	1.111	0.924	0.374	0.973	0.0
42	0.7000	0.7634	-0.27967	0.00087	1.055	0.910	0.281	0.973	0.0
43	0.7305	0.7927	-0.08962	0.02307	0.959	0.897	0.113	0.0	0.0
44	0.7601	0.8211	0.03854	0.04508	0.888	0.884	0.007	0.0	0.0
45	0.7884	0.8481	0.08458	0.06879	0.861	0.871	-0.016	0.0	0.0
46	0.8149	0.8735	0.10537	0.09377	0.849	0.856	-0.012	0.0	0.0
47	0.8396	0.8972	0.13016	0.11837	0.834	0.841	-0.012	0.0	0.0
48	0.8626	0.9193	0.14987	0.14000	0.822	0.828	-0.010	0.0	0.0
49	0.8844	0.9401	0.15818	0.15344	0.817	0.820	-0.005	0.0	0.0
50	0.9054	0.9603	0.17363	0.16627	0.807	0.812	-0.007	0.0	0.0
51	0.9261	0.9801	0.19735	0.19152	0.792	0.796	-0.006	0.0	0.0
52	0.9468	1.0000	0.24346	0.24252	0.762	0.762	-0.001	0.0	0.0
53	0.9681	1.0204	0.23718	0.23859	0.766	0.765	0.001	0.0	0.0
54	0.9937	1.0449	0.17731	0.17745	0.805	0.805	0.000	0.0	0.0
55	1.0329	1.0826	0.13645	0.13647	0.830	0.830	0.000	0.0	0.0
56	1.1063	1.1529	0.10174	0.10174	0.851	0.851	0.000	0.0	0.0
57	1.2288	1.2703	0.07475	0.07473	0.867	0.867	-0.000	0.0	0.0
58	1.3619	1.3979	0.05764	0.05207	0.877	0.880	-0.006	0.0	0.0



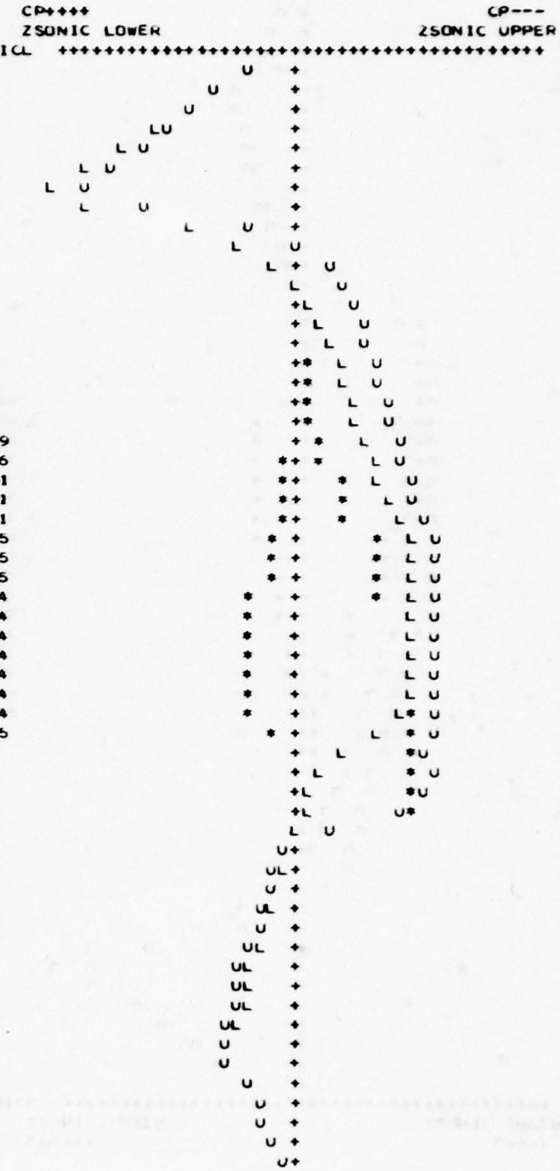
K= 5   SPAN STATION ETA= 0.14545   Y= 0.32727

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.2401	-0.2013	0.16180	0.16108	0.815	0.815	-0.001	0.0	0.0
3	-0.1250	-0.0881	0.27380	0.27459	0.741	0.741	0.001	0.0	0.0
4	-0.0865	-0.0502	0.37638	0.38184	0.667	0.663	0.005	0.0	0.0
5	-0.0683	-0.0323	0.46366	0.48176	0.597	0.561	0.018	0.0	0.0
6	-0.0569	-0.0210	0.54463	0.58527	0.523	0.482	0.041	0.0	0.0
7	-0.0478	-0.0121	0.62808	0.70381	0.435	0.335	0.076	0.0	0.0
8	-0.0396	-0.0040	0.72341	0.85345	0.303	0.032	0.130	0.0	0.0
9	-0.0315	0.0040	0.53447	0.70917	0.533	0.326	0.175	0.0	0.0
10	-0.0233	0.0120	0.16435	0.37068	0.800	0.672	0.186	0.0	0.0
11	-0.0151	0.0201	0.01372	0.19579	0.902	0.793	0.182	0.0	0.0
12	-0.0067	0.0283	-0.08303	0.08855	0.955	0.859	0.172	0.0	0.0
13	0.0020	0.0369	-0.14001	0.01912	0.985	0.899	0.159	0.0	0.0
14	0.0113	0.0461	-0.17509	-0.02792	1.003	0.925	0.147	0.0	0.0
15	0.0214	0.0561	-0.19726	-0.06176	1.014	0.944	0.135	0.0	0.0
16	0.0328	0.0672	-0.21608	-0.09055	1.024	0.959	0.126	0.029	0.0
17	0.0457	0.0799	-0.23362	-0.11593	1.032	0.973	0.118	0.029	0.0
18	0.0607	0.0947	-0.24972	-0.13932	1.040	0.985	0.110	0.066	0.0
19	0.0784	0.1121	-0.26692	-0.16341	1.049	0.997	0.104	0.066	0.0
20	0.0992	0.1326	-0.28414	-0.18741	1.057	1.009	0.097	0.131	0.0
21	0.1233	0.1564	-0.30271	-0.21229	1.066	1.022	0.090	0.131	-0.029
22	0.1505	0.1831	-0.32374	-0.23868	1.076	1.035	0.065	0.235	-0.029
23	0.1799	0.2120	-0.34757	-0.26664	1.087	1.049	0.081	0.235	-0.066
24	0.2103	0.2419	-0.37398	-0.29590	1.099	1.063	0.078	0.394	-0.131
25	0.2407	0.2719	-0.40317	-0.32650	1.113	1.077	0.077	0.394	-0.131
26	0.2707	0.3014	-0.42852	-0.35179	1.124	1.089	0.077	0.394	-0.235
27	0.3000	0.3303	-0.44279	-0.36482	1.131	1.095	0.078	0.631	-0.235
28	0.3289	0.3587	-0.44864	-0.36944	1.133	1.097	0.079	0.631	-0.235
29	0.3574	0.3867	-0.45119	-0.37116	1.135	1.098	0.080	0.631	-0.235
30	0.3857	0.4146	-0.45269	-0.37180	1.135	1.098	0.081	0.631	-0.394
31	0.4140	0.4425	-0.45302	-0.37151	1.135	1.098	0.082	0.973	-0.394
32	0.4425	0.4705	-0.45237	-0.37129	1.135	1.098	0.081	0.973	-0.394
33	0.4712	0.4987	-0.45109	-0.37252	1.134	1.099	0.079	0.973	-0.394
34	0.5001	0.5272	-0.44874	-0.37434	1.133	1.100	0.074	0.973	-0.394
35	0.5293	0.5559	-0.44455	-0.36924	1.132	1.097	0.075	0.973	-0.394
36	0.5588	0.5850	-0.43827	-0.33736	1.129	1.082	0.101	0.973	-0.394
37	0.5886	0.6143	-0.43223	-0.25739	1.126	1.044	0.175	0.973	-0.235
38	0.6187	0.6439	-0.43071	-0.14912	1.125	0.990	0.282	0.973	0.0
39	0.6489	0.6737	-0.43476	-0.07105	1.127	0.949	0.364	0.973	0.0
40	0.6794	0.7037	-0.41575	-0.03371	1.119	0.929	0.382	0.973	0.0
41	0.7098	0.7336	-0.30102	-0.00905	1.065	0.915	0.292	0.973	0.0
42	0.7401	0.7634	-0.10378	0.01261	0.966	0.903	0.116	0.0	0.0
43	0.7698	0.7927	0.03186	0.03384	0.892	0.891	0.002	0.0	0.0
44	0.7986	0.8211	0.07577	0.05572	0.867	0.878	-0.020	0.0	0.0
45	0.8261	0.8481	0.09870	0.07850	0.853	0.865	-0.020	0.0	0.0
46	0.8519	0.8735	0.11891	0.10142	0.841	0.851	-0.017	0.0	0.0
47	0.8760	0.8972	0.14827	0.12318	0.823	0.838	-0.025	0.0	0.0
48	0.8984	0.9193	0.17768	0.14185	0.805	0.827	-0.036	0.0	0.0
49	0.9196	0.9401	0.18455	0.15309	0.800	0.820	-0.031	0.0	0.0
50	0.9401	0.9603	0.18572	0.16396	0.799	0.813	-0.022	0.0	0.0
51	0.9602	0.9801	0.20063	0.18638	0.790	0.799	-0.014	0.0	0.0
52	0.9804	1.0000	0.23553	0.23335	0.767	0.769	-0.002	0.0	0.0
53	1.0011	1.0204	0.22616	0.22926	0.773	0.771	0.003	0.0	0.0
54	1.0260	1.0449	0.17160	0.17184	0.808	0.808	0.000	0.0	0.0
55	1.0643	1.0826	0.13315	0.13317	0.832	0.632	0.000	0.0	0.0
56	1.1357	1.1529	0.09976	0.09977	0.852	0.852	0.000	0.0	0.0
57	1.2550	1.2703	0.07342	0.07340	0.868	0.868	-0.000	0.0	0.0
58	1.3846	1.3979	0.05483	0.05284	0.879	0.880	-0.002	0.0	0.0



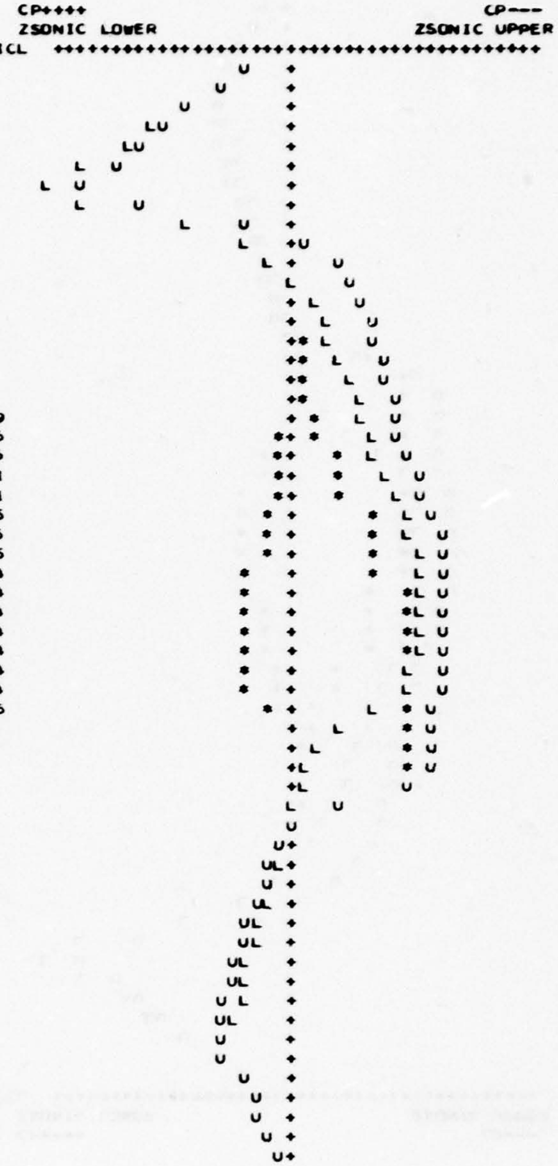
K= 6 SPAN STATION ETA= 0.18182 Y= 0.40909

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.1737	-0.2013	0.15944	0.15869	0.816	0.816	-0.001	0.0	0.0
3	-0.0617	-0.0881	0.25853	0.25943	0.752	0.751	0.001	0.0	0.0
4	-0.0242	-0.0502	0.35663	0.36274	0.682	0.678	0.006	0.0	0.0
5	-0.0066	-0.0323	0.44381	0.46367	0.614	0.597	0.020	0.0	0.0
6	0.0046	-0.0210	0.52411	0.56799	0.543	0.500	0.044	0.0	0.0
7	0.0134	-0.0121	0.60609	0.68672	0.460	0.360	0.081	0.0	0.0
8	0.0214	-0.0040	0.69891	0.83560	0.342	0.032	0.137	0.0	0.0
9	0.0293	0.0040	0.50977	0.69309	0.556	0.351	0.183	0.0	0.0
10	0.0372	0.0120	0.16039	0.35704	0.815	0.682	0.197	0.0	0.0
11	0.0452	0.0201	-0.01200	0.18135	0.917	0.802	0.193	0.0	0.0
12	0.0534	0.0283	-0.11106	0.07229	0.970	0.869	0.183	0.0	0.0
13	0.0619	0.0369	-0.17019	0.00086	1.001	0.910	0.171	0.0	0.0
14	0.0709	0.0461	-0.20694	-0.04799	1.019	0.936	0.159	0.029	0.0
15	0.0808	0.0561	-0.22933	-0.08332	1.030	0.955	0.146	0.029	0.0
16	0.0918	0.0672	-0.24777	-0.11324	1.039	0.971	0.135	0.029	0.0
17	0.1044	0.0799	-0.26566	-0.13953	1.048	0.985	0.126	0.066	0.0
18	0.1190	0.0947	-0.28182	-0.16386	1.056	0.997	0.118	0.066	0.0
19	0.1362	0.1121	-0.29864	-0.18880	1.064	1.010	0.110	0.131	0.0
20	0.1564	0.1326	-0.31540	-0.21295	1.072	1.022	0.102	0.131	0.0
21	0.1799	0.1564	-0.33340	-0.23749	1.080	1.034	0.096	0.235	-0.029
22	0.2064	0.1831	-0.35365	-0.26340	1.090	1.047	0.090	0.235	-0.066
23	0.2350	0.2120	-0.37648	-0.29058	1.101	1.060	0.086	0.394	-0.131
24	0.2645	0.2419	-0.40177	-0.31895	1.112	1.074	0.083	0.394	-0.131
25	0.2942	0.2719	-0.43000	-0.34880	1.125	1.088	0.081	0.394	-0.131
26	0.3233	0.3014	-0.45464	-0.37348	1.136	1.099	0.081	0.631	-0.235
27	0.3519	0.3303	-0.46855	-0.38582	1.142	1.105	0.083	0.631	-0.235
28	0.3800	0.3587	-0.47354	-0.38931	1.145	1.106	0.084	0.631	-0.235
29	0.4077	0.3867	-0.47498	-0.38964	1.145	1.107	0.085	0.631	-0.394
30	0.4353	0.4146	-0.47508	-0.38887	1.145	1.106	0.086	0.973	-0.394
31	0.4628	0.4425	-0.47368	-0.38762	1.145	1.106	0.086	0.973	-0.394
32	0.4905	0.4705	-0.47128	-0.38746	1.144	1.106	0.084	0.973	-0.394
33	0.5184	0.4987	-0.46825	-0.38813	1.142	1.106	0.080	0.973	-0.394
34	0.5466	0.5272	-0.46391	-0.38191	1.140	1.103	0.082	0.973	-0.394
35	0.5750	0.5559	-0.45773	-0.34954	1.137	1.088	0.108	0.973	-0.394
36	0.6037	0.5850	-0.45054	-0.26858	1.134	1.049	0.182	0.973	-0.235
37	0.6327	0.6143	-0.44655	-0.15720	1.132	0.994	0.289	0.973	0.0
38	0.6620	0.6439	-0.44767	-0.07824	1.133	0.953	0.369	0.973	0.0
39	0.6914	0.6737	-0.43324	-0.04314	1.126	0.934	0.390	0.973	0.0
40	0.7210	0.7037	-0.33302	-0.02048	1.080	0.921	0.313	0.973	0.0
41	0.7507	0.7336	-0.13024	0.00020	0.980	0.910	0.130	0.0	0.0
42	0.7801	0.7634	0.01966	0.02075	0.899	0.898	0.001	0.0	0.0
43	0.8090	0.7927	0.06372	0.04122	0.874	0.887	-0.023	0.0	0.0
44	0.8371	0.8211	0.08428	0.06218	0.862	0.875	-0.022	0.0	0.0
45	0.8638	0.8481	0.10301	0.08327	0.850	0.862	-0.020	0.0	0.0
46	0.8890	0.8735	0.12796	0.10422	0.835	0.850	-0.024	0.0	0.0
47	0.9124	0.8972	0.15974	0.12399	0.816	0.838	-0.036	0.0	0.0
48	0.9342	0.9193	0.18800	0.14063	0.798	0.828	-0.047	0.0	0.0
49	0.9548	0.9401	0.20262	0.15052	0.789	0.822	-0.052	0.0	0.0
50	0.9747	0.9603	0.20981	0.16019	0.784	0.816	-0.050	0.0	0.0
51	0.9944	0.9801	0.21582	0.18070	0.780	0.803	-0.035	0.0	0.0
52	1.0140	1.0000	0.23196	0.22445	0.769	0.774	-0.008	0.0	0.0
53	1.0342	1.0204	0.21614	0.22125	0.780	0.777	0.005	0.0	0.0
54	1.0584	1.0449	0.16788	0.16822	0.811	0.811	0.000	0.0	0.0
55	1.0956	1.0826	0.13143	0.13144	0.833	0.833	0.000	0.0	0.0
56	1.1652	1.1529	0.09869	0.09869	0.853	0.853	0.000	0.0	0.0
57	1.2813	1.2703	0.07261	0.07261	0.868	0.868	-0.000	0.0	0.0
58	1.4074	1.3979	0.05275	0.05416	0.880	0.879	0.001	0.0	0.0



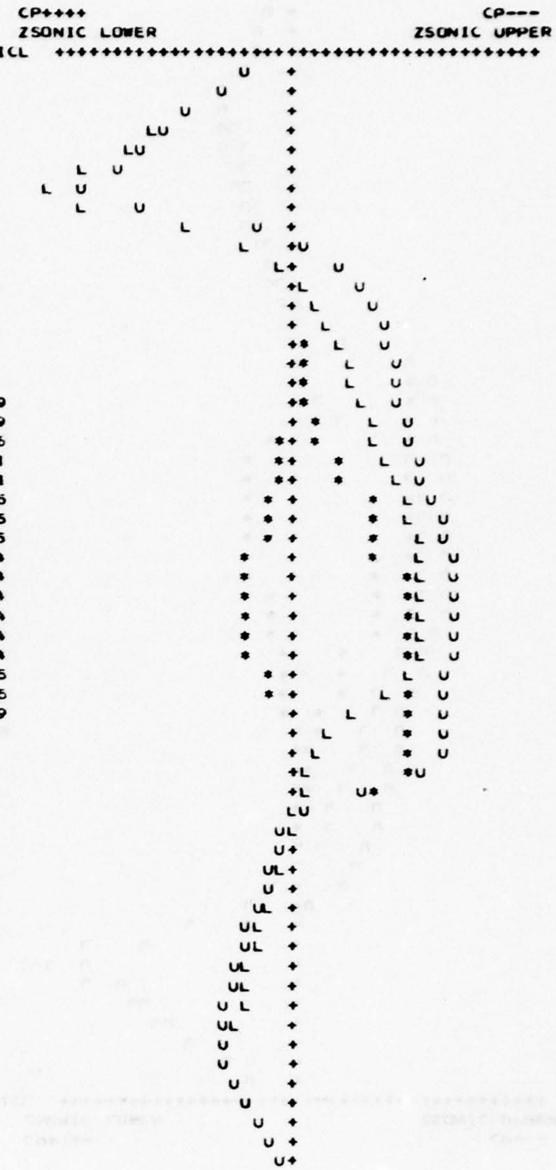
K= 7 SPAN STATION ETA= 0.21818 Y= 0.49091

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.1073	-0.2013	0.15418	0.15342	0.819	0.820	-0.001	0.0	0.0
3	0.0015	-0.0881	0.24128	0.24230	0.763	0.763	0.001	0.0	0.0
4	0.0380	-0.0502	0.33795	0.34472	0.696	0.691	0.007	0.0	0.0
5	0.0552	-0.0323	0.42544	0.44703	0.629	0.611	0.022	0.0	0.0
6	0.0660	-0.0210	0.50526	0.55217	0.560	0.516	0.047	0.0	0.0
7	0.0746	-0.0121	0.58598	0.67095	0.482	0.381	0.085	0.0	0.0
8	0.0824	-0.0040	0.67656	0.81882	0.374	0.032	0.142	0.0	0.0
9	0.0901	0.0040	0.48775	0.67817	0.576	0.372	0.190	0.0	0.0
10	0.0978	0.0120	0.13974	0.34509	0.826	0.691	0.205	0.0	0.0
11	0.1055	0.0201	-0.03406	0.16910	0.929	0.810	0.203	0.0	0.0
12	0.1135	0.0283	-0.13532	0.05857	0.983	0.877	0.194	0.0	0.0
13	0.1217	0.0369	-0.19673	-0.01466	1.014	0.918	0.182	0.0	0.0
14	0.1305	0.0461	-0.23424	-0.06525	1.033	0.946	0.169	0.029	0.0
15	0.1401	0.0561	-0.25672	-0.10190	1.044	0.965	0.155	0.029	0.0
16	0.1508	0.0672	-0.27576	-0.13285	1.053	0.981	0.143	0.066	0.0
17	0.1631	0.0799	-0.29404	-0.16019	1.062	0.996	0.134	0.066	0.0
18	0.1773	0.0947	-0.31039	-0.18548	1.070	1.008	0.125	0.066	0.0
19	0.1940	0.1121	-0.32703	-0.21060	1.077	1.021	0.116	0.131	0.0
20	0.2137	0.1326	-0.34325	-0.23451	1.085	1.033	0.109	0.235	-0.029
21	0.2366	0.1564	-0.36055	-0.25896	1.093	1.045	0.102	0.235	-0.066
22	0.2623	0.1831	-0.38006	-0.28446	1.102	1.057	0.096	0.394	-0.066
23	0.2901	0.2120	-0.40201	-0.31100	1.112	1.070	0.091	0.394	-0.131
24	0.3188	0.2419	-0.42647	-0.33873	1.123	1.083	0.088	0.394	-0.131
25	0.3476	0.2719	-0.45399	-0.36804	1.136	1.097	0.086	0.631	-0.235
26	0.3760	0.3014	-0.47846	-0.39227	1.147	1.108	0.086	0.631	-0.235
27	0.4038	0.3303	-0.49216	-0.40426	1.153	1.113	0.088	0.631	-0.235
28	0.4311	0.3587	-0.49685	-0.40705	1.155	1.115	0.090	0.631	-0.394
29	0.4580	0.3867	-0.49741	-0.40639	1.155	1.114	0.091	0.973	-0.394
30	0.4848	0.4146	-0.49613	-0.40492	1.155	1.114	0.091	0.973	-0.394
31	0.5117	0.4425	-0.49321	-0.40344	1.153	1.113	0.090	0.973	-0.394
32	0.5386	0.4705	-0.48954	-0.40229	1.152	1.112	0.087	0.973	-0.394
33	0.5657	0.4987	-0.48505	-0.39483	1.150	1.109	0.090	0.973	-0.394
34	0.5931	0.5272	-0.47889	-0.36223	1.147	1.094	0.117	0.973	-0.394
35	0.6207	0.5559	-0.47151	-0.28239	1.144	1.056	0.189	0.973	-0.235
36	0.6486	0.5850	-0.46521	-0.16889	1.141	1.000	0.296	0.973	0.0
37	0.6768	0.6143	-0.46343	-0.08750	1.140	0.958	0.376	0.973	0.0
38	0.7053	0.6439	-0.45194	-0.05394	1.135	0.940	0.398	0.973	0.0
39	0.7339	0.6737	-0.37003	-0.03306	1.098	0.928	0.337	0.973	0.0
40	0.7627	0.7037	-0.16740	-0.01409	0.999	0.918	0.153	0.394	0.0
41	0.7915	0.7336	0.00257	0.00591	0.909	0.907	0.003	0.0	0.0
42	0.8202	0.7634	0.05048	0.02603	0.881	0.895	-0.024	0.0	0.0
43	0.8483	0.7927	0.06801	0.04573	0.871	0.884	-0.022	0.0	0.0
44	0.8756	0.8211	0.08334	0.06544	0.862	0.873	-0.018	0.0	0.0
45	0.9016	0.8481	0.10486	0.08506	0.849	0.861	-0.020	0.0	0.0
46	0.9260	0.8735	0.13388	0.10461	0.832	0.850	-0.029	0.0	0.0
47	0.9488	0.8972	0.16496	0.12309	0.813	0.838	-0.042	0.0	0.0
48	0.9700	0.9193	0.18954	0.13869	0.797	0.829	-0.051	0.0	0.0
49	0.9901	0.9401	0.20364	0.14840	0.788	0.823	-0.055	0.0	0.0
50	1.0094	0.9603	0.21097	0.15868	0.783	0.816	-0.052	0.0	0.0
51	1.0285	0.9801	0.21534	0.18062	0.780	0.803	-0.035	0.0	0.0
52	1.0476	1.0000	0.23304	0.22802	0.769	0.772	-0.005	0.0	0.0
53	1.0672	1.0204	0.21933	0.22565	0.778	0.774	0.006	0.0	0.0
54	1.0908	1.0449	0.16954	0.16998	0.810	0.809	0.000	0.0	0.0
55	1.1270	1.0826	0.13172	0.13173	0.833	0.833	0.000	0.0	0.0
56	1.1946	1.1529	0.09833	0.09834	0.853	0.853	0.000	0.0	0.0
57	1.3075	1.2703	0.07223	0.07224	0.869	0.869	0.000	0.0	0.0
58	1.4301	1.3979	0.05371	0.05272	0.879	0.880	-0.001	0.0	0.0



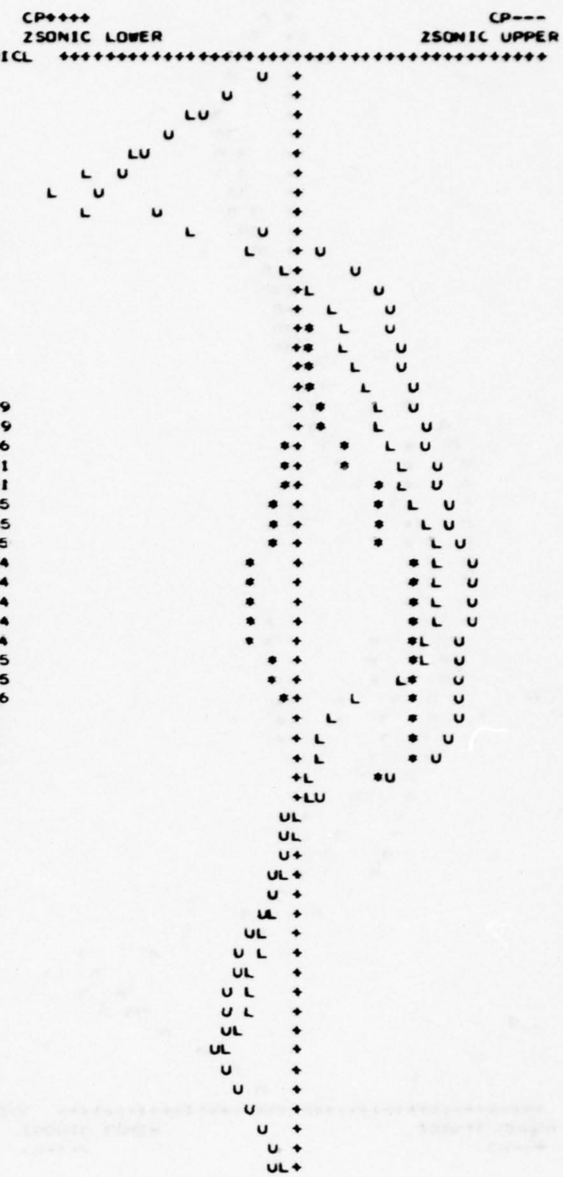
K= 8 SPAN STATION ETA= 0.25455 Y= 0.57273

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	-0.0410	-0.2013	0.13927	0.13770	0.828	0.829	-0.002	0.0	0.0
3	0.0646	-0.0881	0.22342	0.22455	0.775	0.774	0.001	0.0	0.0
4	0.1003	-0.0502	0.32094	0.32840	0.708	0.703	0.007	0.0	0.0
5	0.1169	-0.0323	0.40886	0.43220	0.642	0.623	0.023	0.0	0.0
6	0.1275	-0.0210	0.48812	0.53798	0.576	0.530	0.050	0.0	0.0
7	0.1356	-0.0121	0.56752	0.65657	0.501	0.400	0.089	0.0	0.0
8	0.1434	-0.0040	0.65587	0.80308	0.401	0.105	0.147	0.0	0.0
9	0.1508	0.0040	0.46770	0.66431	0.594	0.390	0.197	0.0	0.0
10	0.1583	0.0120	0.12149	0.33462	0.839	0.698	0.213	0.0	0.0
11	0.1659	0.0201	-0.05343	0.15871	0.939	0.816	0.212	0.0	0.0
12	0.1736	0.0283	-0.15672	0.04708	0.994	0.883	0.204	0.0	0.0
13	0.1816	0.0369	-0.21966	-0.02765	1.025	0.925	0.192	0.029	0.0
14	0.1902	0.0461	-0.25761	-0.07972	1.044	0.954	0.178	0.029	0.0
15	0.1995	0.0561	-0.28037	-0.11748	1.055	0.973	0.163	0.029	0.0
16	0.2099	0.0672	-0.29992	-0.14944	1.065	0.990	0.150	0.066	0.0
17	0.2217	0.0799	-0.31855	-0.17787	1.073	1.005	0.141	0.066	0.0
18	0.2356	0.0947	-0.33510	-0.20363	1.081	1.017	0.131	0.131	0.0
19	0.2516	0.1121	-0.35175	-0.22888	1.089	1.030	0.123	0.131	-0.029
20	0.2710	0.1326	-0.36773	-0.25302	1.096	1.042	0.115	0.235	-0.029
21	0.2932	0.1564	-0.38460	-0.27722	1.104	1.054	0.107	0.235	-0.066
22	0.3182	0.1831	-0.40354	-0.30208	1.113	1.066	0.101	0.394	-0.131
23	0.3451	0.2120	-0.42476	-0.32814	1.123	1.078	0.097	0.394	-0.131
24	0.3731	0.2419	-0.44853	-0.35547	1.133	1.091	0.093	0.631	-0.235
25	0.4011	0.2719	-0.47555	-0.38444	1.145	1.104	0.091	0.631	-0.235
26	0.4286	0.3014	-0.49984	-0.40862	1.156	1.115	0.091	0.631	-0.235
27	0.4556	0.3303	-0.51368	-0.42055	1.162	1.121	0.093	0.631	-0.394
28	0.4822	0.3587	-0.51841	-0.42294	1.164	1.122	0.095	0.973	-0.394
29	0.5084	0.3867	-0.51852	-0.42172	1.164	1.121	0.097	0.973	-0.394
30	0.5344	0.4146	-0.51631	-0.41962	1.163	1.120	0.097	0.973	-0.394
31	0.5605	0.4425	-0.51220	-0.41686	1.162	1.119	0.095	0.973	-0.394
32	0.5866	0.4705	-0.50701	-0.40795	1.159	1.115	0.099	0.973	-0.394
33	0.6130	0.4987	-0.50086	-0.37542	1.157	1.100	0.125	0.973	-0.235
34	0.6396	0.5272	-0.49358	-0.29727	1.153	1.063	0.196	0.973	-0.235
35	0.6664	0.5559	-0.48646	-0.18362	1.150	1.007	0.303	0.973	-0.029
36	0.6935	0.5850	-0.48139	-0.09925	1.148	0.964	0.382	0.973	0.0
37	0.7209	0.6143	-0.47098	-0.06555	1.143	0.946	0.405	0.973	0.0
38	0.7486	0.6439	-0.40591	-0.04679	1.114	0.936	0.359	0.973	0.0
39	0.7764	0.6737	-0.21871	-0.02917	1.025	0.926	0.190	0.631	0.0
40	0.8044	0.7037	-0.02885	-0.01064	0.926	0.916	0.018	0.0	0.0
41	0.8324	0.7336	0.04009	0.00928	0.887	0.905	-0.031	0.0	0.0
42	0.8602	0.7634	0.05476	0.02905	0.879	0.894	-0.026	0.0	0.0
43	0.8876	0.7927	0.06601	0.04794	0.872	0.883	-0.018	0.0	0.0
44	0.9141	0.8211	0.08262	0.06662	0.862	0.872	-0.016	0.0	0.0
45	0.9393	0.8481	0.10709	0.08508	0.848	0.861	-0.022	0.0	0.0
46	0.9631	0.8735	0.13707	0.10342	0.830	0.850	-0.034	0.0	0.0
47	0.9852	0.8972	0.16601	0.12114	0.812	0.840	-0.045	0.0	0.0
48	1.0058	0.9193	0.18811	0.13643	0.798	0.830	-0.052	0.0	0.0
49	1.0253	0.9401	0.20303	0.14674	0.788	0.824	-0.056	0.0	0.0
50	1.0441	0.9603	0.21251	0.15854	0.782	0.817	-0.054	0.0	0.0
51	1.0627	0.9801	0.21864	0.18250	0.778	0.802	-0.036	0.0	0.0
52	1.0812	1.0000	0.23725	0.23247	0.766	0.769	-0.005	0.0	0.0
53	1.1003	1.0204	0.22276	0.22992	0.776	0.771	0.007	0.0	0.0
54	1.1232	1.0449	0.17114	0.17167	0.809	0.808	0.001	0.0	0.0
55	1.1583	1.0826	0.13208	0.13208	0.833	0.833	0.000	0.0	0.0
56	1.2240	1.1529	0.09829	0.09829	0.853	0.853	0.000	0.0	0.0
57	1.3337	1.2703	0.07219	0.07218	0.869	0.869	-0.000	0.0	0.0
58	1.4529	1.3979	0.05507	0.05145	0.879	0.881	-0.004	0.0	0.0



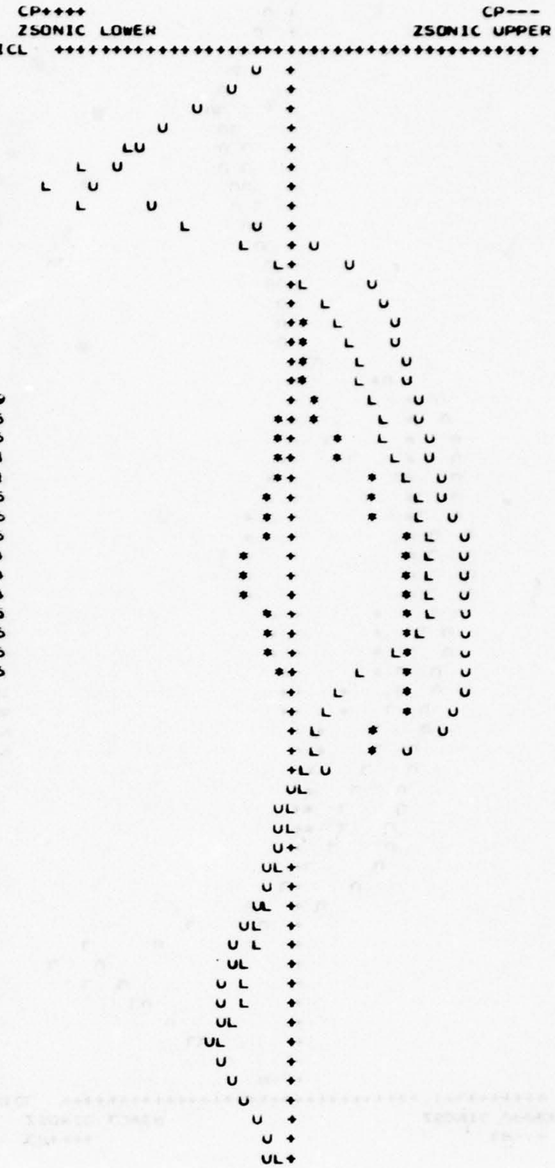
K= 9 SPAN STATION ETA= 0.29091 Y= 0.65455

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.0254	-0.2013	0.12606	0.12423	0.837	0.838	-0.002	0.0	0.0
3	0.1281	-0.0881	0.20833	0.20960	0.785	0.784	0.001	0.0	0.0
4	0.1625	-0.0502	0.30691	0.31512	0.718	0.712	0.008	0.0	0.0
5	0.1787	-0.0323	0.39494	0.42010	0.653	0.633	0.025	0.0	0.0
6	0.1889	-0.0210	0.47333	0.52615	0.589	0.541	0.053	0.0	0.0
7	0.1970	-0.0121	0.55114	0.64412	0.517	0.416	0.093	0.0	0.0
8	0.2044	-0.0040	0.63706	0.78884	0.424	0.160	0.152	0.0	0.0
9	0.2116	0.0040	0.44967	0.65191	0.609	0.406	0.202	0.0	0.0
10	0.2189	0.0120	0.10559	0.32593	0.849	0.705	0.220	0.0	0.0
11	0.2262	0.0201	-0.07037	0.15032	0.949	0.822	0.221	0.0	0.0
12	0.2337	0.0283	-0.17576	0.03774	1.003	0.889	0.214	0.0	0.0
13	0.2415	0.0369	-0.23950	-0.03836	1.035	0.931	0.201	0.029	0.0
14	0.2498	0.0461	-0.27781	-0.09180	1.054	0.960	0.186	0.029	0.0
15	0.2588	0.0561	-0.30147	-0.13059	1.065	0.980	0.171	0.066	0.0
16	0.2689	0.0672	-0.32127	-0.16345	1.075	0.997	0.158	0.066	0.0
17	0.2804	0.0799	-0.34003	-0.19271	1.084	1.012	0.147	0.131	0.0
18	0.2939	0.0947	-0.35662	-0.21879	1.091	1.025	0.138	0.131	0.0
19	0.3096	0.1121	-0.37321	-0.24420	1.099	1.038	0.129	0.235	-0.029
20	0.3282	0.1326	-0.38917	-0.26834	1.106	1.049	0.121	0.235	-0.029
21	0.3498	0.1564	-0.40597	-0.29221	1.114	1.061	0.114	0.394	-0.066
22	0.3740	0.1831	-0.42445	-0.31681	1.122	1.073	0.108	0.394	-0.131
23	0.4002	0.2120	-0.44501	-0.34262	1.132	1.085	0.102	0.631	-0.131
24	0.4274	0.2419	-0.46823	-0.36979	1.142	1.097	0.098	0.631	-0.235
25	0.4545	0.2719	-0.49491	-0.39867	1.154	1.111	0.096	0.631	-0.235
26	0.4813	0.3014	-0.51920	-0.42279	1.165	1.122	0.096	0.631	-0.235
27	0.5075	0.3303	-0.53331	-0.43459	1.171	1.127	0.099	0.973	-0.394
28	0.5333	0.3587	-0.53819	-0.43691	1.173	1.128	0.101	0.973	-0.394
29	0.5587	0.3867	-0.53806	-0.43544	1.173	1.127	0.103	0.973	-0.394
30	0.5840	0.4146	-0.53526	-0.43131	1.172	1.126	0.104	0.973	-0.394
31	0.6093	0.4425	-0.53030	-0.42046	1.169	1.121	0.110	0.973	-0.394
32	0.6347	0.4705	-0.52380	-0.38835	1.167	1.106	0.135	0.973	-0.235
33	0.6602	0.4987	-0.51625	-0.31298	1.163	1.071	0.203	0.973	-0.235
34	0.6860	0.5272	-0.50846	-0.20073	1.160	1.016	0.308	0.973	-0.066
35	0.7121	0.5559	-0.50179	-0.11345	1.157	0.971	0.388	0.973	0.0
36	0.7385	0.5850	-0.49175	-0.07808	1.153	0.953	0.414	0.973	0.0
37	0.7651	0.6143	-0.44265	-0.06147	1.131	0.944	0.381	0.973	0.0
38	0.7919	0.6439	-0.27892	-0.04561	1.054	0.935	0.233	0.631	0.0
39	0.8189	0.6737	-0.07035	-0.02794	0.949	0.925	0.042	0.0	0.0
40	0.8461	0.7037	0.02957	-0.00886	0.893	0.915	-0.038	0.0	0.0
41	0.8733	0.7336	0.04537	0.01090	0.884	0.904	-0.034	0.0	0.0
42	0.9003	0.7634	0.05217	0.03004	0.880	0.893	-0.022	0.0	0.0
43	0.9268	0.7927	0.06382	0.04821	0.874	0.883	-0.016	0.0	0.0
44	0.9525	0.8211	0.08304	0.06598	0.862	0.872	-0.017	0.0	0.0
45	0.9771	0.8481	0.10884	0.08361	0.847	0.862	-0.025	0.0	0.0
46	1.0001	0.8735	0.13867	0.10136	0.829	0.851	-0.037	0.0	0.0
47	1.0216	0.8972	0.16588	0.11873	0.812	0.841	-0.047	0.0	0.0
48	1.0416	0.9193	0.18686	0.13407	0.799	0.832	-0.053	0.0	0.0
49	1.0605	0.9401	0.20314	0.14508	0.788	0.825	-0.058	0.0	0.0
50	1.0788	0.9603	0.21490	0.15796	0.781	0.817	-0.057	0.0	0.0
51	1.0968	0.9801	0.22347	0.18299	0.775	0.801	-0.040	0.0	0.0
52	1.1148	1.0000	0.24186	0.23413	0.763	0.768	-0.008	0.0	0.0
53	1.1333	1.0204	0.22497	0.23169	0.774	0.770	0.007	0.0	0.0
54	1.1555	1.0449	0.17208	0.17259	0.808	0.808	0.001	0.0	0.0
55	1.1897	1.0826	0.13253	0.13253	0.833	0.833	0.000	0.0	0.0
56	1.2534	1.1529	0.09859	0.09859	0.853	0.853	0.000	0.0	0.0
57	1.3599	1.2703	0.07238	0.07236	0.869	0.869	-0.000	0.0	0.0
58	1.4756	1.3979	0.05562	0.05063	0.878	0.881	-0.005	0.0	0.0



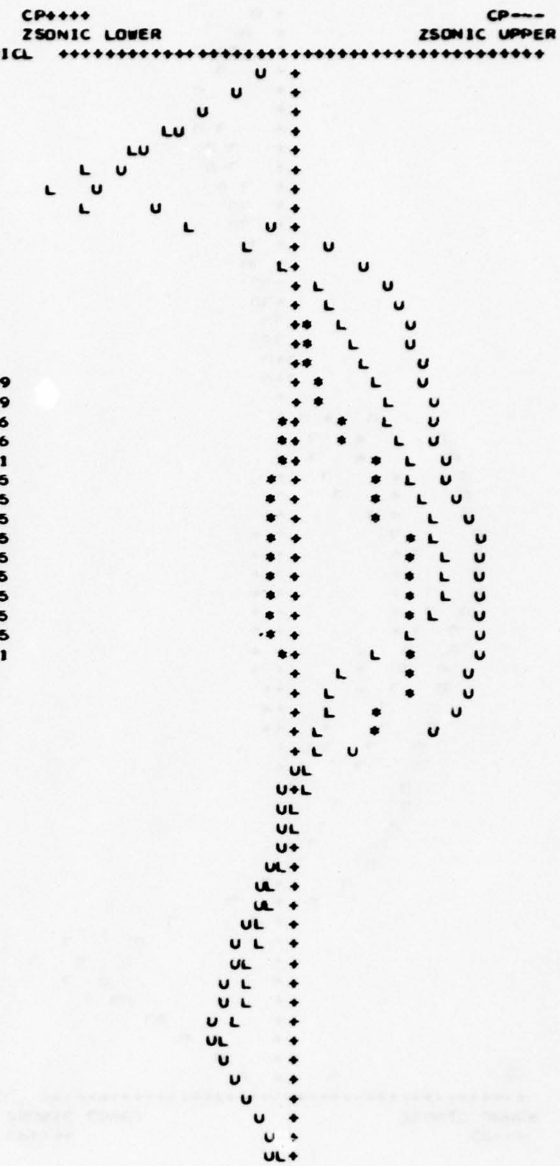
K=10 SPAN STATION ETA= 0.32727 Y= 0.73636

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.0918	-0.2013	0.11320	0.11117	0.844	0.846	-0.002	0.0	0.0
3	0.1914	-0.0881	0.19538	0.19682	0.793	0.792	0.001	0.0	0.0
4	0.2247	-0.0502	0.29513	0.30414	0.727	0.720	0.009	0.0	0.0
5	0.2404	-0.0323	0.38305	0.41011	0.662	0.641	0.027	0.0	0.0
6	0.2504	-0.0210	0.46037	0.51618	0.600	0.550	0.056	0.0	0.0
7	0.2582	-0.0121	0.53641	0.63324	0.531	0.429	0.097	0.0	0.0
8	0.2653	-0.0040	0.61975	0.77583	0.444	0.197	0.156	0.0	0.0
9	0.2724	0.0040	0.43331	0.64075	0.622	0.420	0.207	0.0	0.0
10	0.2794	0.0120	0.09171	0.31876	0.857	0.710	0.227	0.0	0.0
11	0.2865	0.0201	-0.08513	0.14364	0.956	0.826	0.229	0.0	0.0
12	0.2938	0.0283	-0.19263	0.03022	1.012	0.893	0.223	0.0	0.0
13	0.3013	0.0369	-0.25732	-0.04721	1.044	0.936	0.210	0.029	0.0
14	0.3094	0.0461	-0.29601	-0.10198	1.063	0.965	0.194	0.029	0.0
15	0.3182	0.0561	-0.32061	-0.14176	1.074	0.986	0.179	0.066	0.0
16	0.3280	0.0672	-0.34061	-0.17545	1.084	1.003	0.165	0.066	0.0
17	0.3391	0.0799	-0.35937	-0.20509	1.093	1.018	0.154	0.131	0.0
18	0.3521	0.0947	-0.37597	-0.23124	1.100	1.031	0.145	0.131	0.0
19	0.3675	0.1121	-0.39245	-0.25680	1.108	1.044	0.136	0.235	-0.029
20	0.3855	0.1326	-0.40831	-0.28090	1.115	1.055	0.127	0.235	-0.066
21	0.4064	0.1564	-0.42487	-0.30464	1.123	1.067	0.120	0.394	-0.066
22	0.4299	0.1831	-0.44287	-0.32913	1.131	1.078	0.114	0.394	-0.131
23	0.4553	0.2120	-0.46292	-0.35479	1.140	1.090	0.108	0.631	-0.131
24	0.4816	0.2419	-0.48575	-0.38175	1.150	1.103	0.104	0.631	-0.235
25	0.5080	0.2719	-0.51225	-0.41048	1.162	1.116	0.102	0.631	-0.235
26	0.5339	0.3014	-0.53659	-0.43463	1.172	1.127	0.102	0.973	-0.235
27	0.5594	0.3303	-0.55096	-0.44662	1.178	1.132	0.104	0.973	-0.394
28	0.5843	0.3587	-0.55613	-0.44856	1.181	1.133	0.108	0.973	-0.394
29	0.6090	0.3867	-0.55594	-0.44495	1.181	1.132	0.111	0.973	-0.394
30	0.6335	0.4146	-0.55271	-0.43316	1.179	1.126	0.120	0.973	-0.235
31	0.6581	0.4425	-0.54702	-0.40084	1.177	1.112	0.146	0.973	-0.235
32	0.6827	0.4705	-0.53967	-0.32892	1.174	1.078	0.211	0.973	-0.235
33	0.7075	0.4987	-0.53153	-0.21973	1.170	1.026	0.312	0.973	-0.066
34	0.7325	0.5272	-0.52362	-0.12962	1.167	0.980	0.394	0.973	0.0
35	0.7578	0.5559	-0.51406	-0.09177	1.162	0.960	0.422	0.973	0.0
36	0.7834	0.5850	-0.47910	-0.07709	1.147	0.952	0.402	0.631	0.0
37	0.8092	0.6143	-0.34680	-0.06304	1.087	0.945	0.284	0.631	0.0
38	0.8352	0.6439	-0.12321	-0.04628	0.976	0.936	0.077	0.0	0.0
39	0.8614	0.6737	0.01597	-0.02782	0.901	0.925	-0.044	0.0	0.0
40	0.8878	0.7037	0.03716	-0.00865	0.889	0.915	-0.046	0.0	0.0
41	0.9141	0.7336	0.04125	0.01062	0.887	0.904	-0.031	0.0	0.0
42	0.9403	0.7634	0.04889	0.02922	0.882	0.894	-0.020	0.0	0.0
43	0.9661	0.7927	0.06424	0.04694	0.873	0.883	-0.017	0.0	0.0
44	0.9910	0.8211	0.08603	0.06403	0.861	0.873	-0.022	0.0	0.0
45	1.0148	0.8481	0.11208	0.08119	0.845	0.863	-0.031	0.0	0.0
46	1.0372	0.8735	0.13988	0.09840	0.828	0.853	-0.041	0.0	0.0
47	1.0580	0.8972	0.16483	0.11518	0.813	0.843	-0.050	0.0	0.0
48	1.0774	0.9193	0.18545	0.13026	0.800	0.834	-0.055	0.0	0.0
49	1.0958	0.9401	0.20352	0.14141	0.788	0.827	-0.062	0.0	0.0
50	1.1135	0.9603	0.21867	0.15486	0.778	0.819	-0.064	0.0	0.0
51	1.1309	0.9801	0.23291	0.18048	0.769	0.803	-0.052	0.0	0.0
52	1.1484	1.0000	0.24809	0.23143	0.759	0.770	-0.017	0.0	0.0
53	1.1663	1.0204	0.22467	0.23001	0.774	0.771	0.005	0.0	0.0
54	1.1879	1.0449	0.17242	0.17278	0.808	0.808	0.000	0.0	0.0
55	1.2210	1.0826	0.13320	0.13317	0.832	0.832	-0.000	0.0	0.0
56	1.2829	1.1529	0.09919	0.09919	0.853	0.853	-0.000	0.0	0.0
57	1.3862	1.2703	0.07271	0.07269	0.868	0.868	-0.000	0.0	0.0
58	1.4984	1.3979	0.05534	0.05044	0.879	0.881	-0.005	0.0	0.0



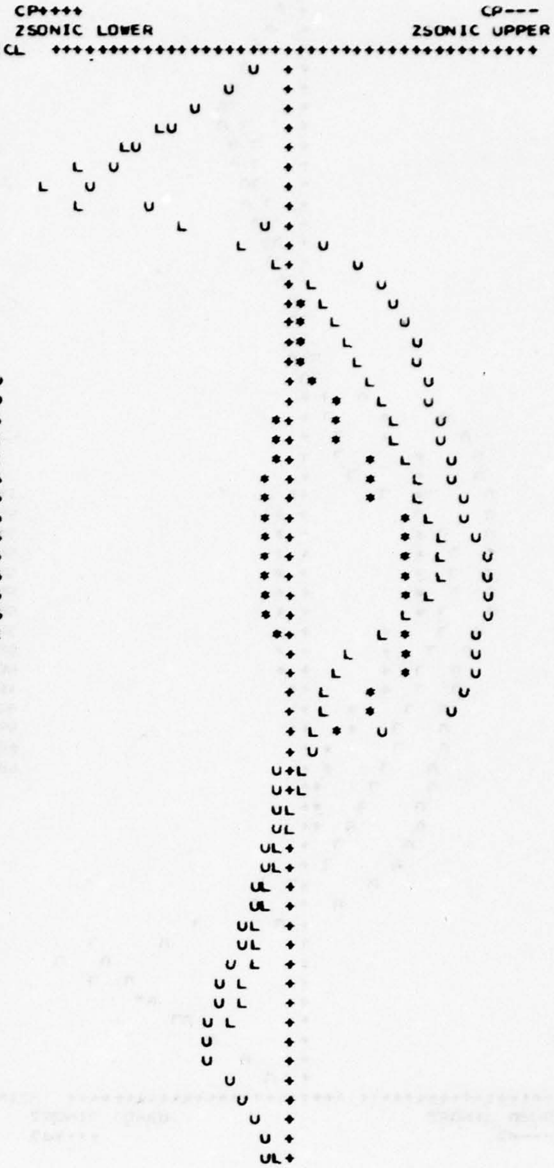
K=11 SPAN STATION ETA= 0.36364 Y= 0.61818

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.1581	-0.2013	0.10220	0.10032	0.851	0.852	-0.002	0.0	0.0
3	0.2546	-0.0881	0.18425	0.18587	0.800	0.799	0.002	0.0	0.0
4	0.2870	-0.0502	0.28510	0.29499	0.734	0.727	0.010	0.0	0.0
5	0.3022	-0.0323	0.37276	0.40184	0.670	0.648	0.029	0.0	0.0
6	0.3118	-0.0210	0.44887	0.50777	0.609	0.558	0.059	0.0	0.0
7	0.3194	-0.0121	0.52302	0.62373	0.544	0.440	0.101	0.0	0.0
8	0.3263	-0.0040	0.60368	0.76394	0.462	0.225	0.160	0.0	0.0
9	0.3331	0.0040	0.41842	0.63080	0.634	0.432	0.212	0.0	0.0
10	0.3400	0.0120	0.07976	0.31319	0.864	0.714	0.233	0.0	0.0
11	0.3468	0.0201	-0.09773	0.13883	0.963	0.829	0.237	0.0	0.0
12	0.3539	0.0283	-0.20723	0.02474	1.019	0.896	0.232	0.0	0.0
13	0.3612	0.0369	-0.27294	-0.05392	1.052	0.940	0.219	0.029	0.0
14	0.3690	0.0461	-0.31214	-0.11002	1.070	0.970	0.202	0.029	0.0
15	0.3775	0.0561	-0.33777	-0.15081	1.082	0.991	0.187	0.066	0.0
16	0.3870	0.0672	-0.35808	-0.18517	1.092	1.008	0.173	0.066	0.0
17	0.3978	0.0799	-0.37686	-0.21516	1.101	1.023	0.162	0.131	0.0
18	0.4104	0.0947	-0.39351	-0.24139	1.108	1.036	0.152	0.235	-0.029
19	0.4253	0.1121	-0.40990	-0.26700	1.116	1.049	0.143	0.235	-0.029
20	0.4427	0.1326	-0.42551	-0.29099	1.123	1.060	0.135	0.394	-0.066
21	0.4630	0.1564	-0.44144	-0.31470	1.130	1.072	0.127	0.394	-0.066
22	0.4858	0.1831	-0.45895	-0.33911	1.138	1.083	0.120	0.631	-0.131
23	0.5104	0.2120	-0.47870	-0.36458	1.147	1.095	0.114	0.631	-0.235
24	0.5359	0.2419	-0.50116	-0.39121	1.157	1.107	0.110	0.631	-0.235
25	0.5614	0.2719	-0.52737	-0.41987	1.168	1.120	0.108	0.631	-0.235
26	0.5866	0.3014	-0.55173	-0.44388	1.179	1.131	0.108	0.973	-0.235
27	0.6112	0.3303	-0.56650	-0.45534	1.185	1.136	0.111	0.973	-0.235
28	0.6354	0.3587	-0.57203	-0.45545	1.187	1.136	0.117	0.973	-0.235
29	0.6593	0.3867	-0.57198	-0.44427	1.187	1.131	0.128	0.973	-0.235
30	0.6831	0.4146	-0.56864	-0.41301	1.186	1.117	0.156	0.973	-0.235
31	0.7069	0.4425	-0.56279	-0.34532	1.184	1.086	0.217	0.973	-0.235
32	0.7307	0.4705	-0.55517	-0.24120	1.180	1.036	0.314	0.973	-0.131
33	0.7548	0.4987	-0.54698	-0.14851	1.177	0.990	0.398	0.973	0.0
34	0.7790	0.5272	-0.53758	-0.10673	1.173	0.968	0.431	0.973	0.0
35	0.8035	0.5559	-0.51285	-0.09347	1.162	0.961	0.419	0.631	0.0
36	0.8283	0.5850	-0.41563	-0.08129	1.118	0.954	0.334	0.631	0.0
37	0.8533	0.6143	-0.19184	-0.06588	1.012	0.946	0.126	0.235	0.0
38	0.8785	0.6439	-0.00990	-0.04795	0.916	0.936	-0.038	0.0	0.0
39	0.9039	0.6737	0.02930	-0.02902	0.893	0.926	-0.058	0.0	0.0
40	0.9295	0.7037	0.03283	-0.00999	0.891	0.916	-0.043	0.0	0.0
41	0.9550	0.7336	0.03801	0.00875	0.888	0.905	-0.029	0.0	0.0
42	0.9804	0.7634	0.05046	0.02705	0.881	0.895	-0.023	0.0	0.0
43	1.0053	0.7927	0.06851	0.04422	0.871	0.885	-0.024	0.0	0.0
44	1.0295	0.8211	0.09093	0.06071	0.858	0.875	-0.030	0.0	0.0
45	1.0526	0.8481	0.11499	0.07759	0.843	0.866	-0.037	0.0	0.0
46	1.0742	0.8735	0.13935	0.09441	0.828	0.856	-0.045	0.0	0.0
47	1.0944	0.8972	0.16174	0.11060	0.815	0.846	-0.051	0.0	0.0
48	1.1132	0.9193	0.18170	0.12510	0.802	0.837	-0.057	0.0	0.0
49	1.1310	0.9401	0.20070	0.13662	0.790	0.830	-0.064	0.0	0.0
50	1.1482	0.9603	0.21808	0.15132	0.779	0.821	-0.067	0.0	0.0
51	1.1651	0.9801	0.23517	0.17832	0.767	0.804	-0.057	0.0	0.0
52	1.1820	1.0000	0.25192	0.22991	0.756	0.771	-0.022	0.0	0.0
53	1.1994	1.0204	0.22761	0.22996	0.772	0.771	0.002	0.0	0.0
54	1.2203	1.0449	0.17421	0.17425	0.807	0.807	0.000	0.0	0.0
55	1.2524	1.0826	0.13452	0.13447	0.831	0.831	-0.000	0.0	0.0
56	1.3123	1.1529	0.10005	0.10004	0.852	0.852	-0.000	0.0	0.0
57	1.4124	1.2703	0.07315	0.07313	0.868	0.868	-0.000	0.0	0.0
58	1.5211	1.3979	0.05492	0.05121	0.879	0.881	-0.004	0.0	0.0



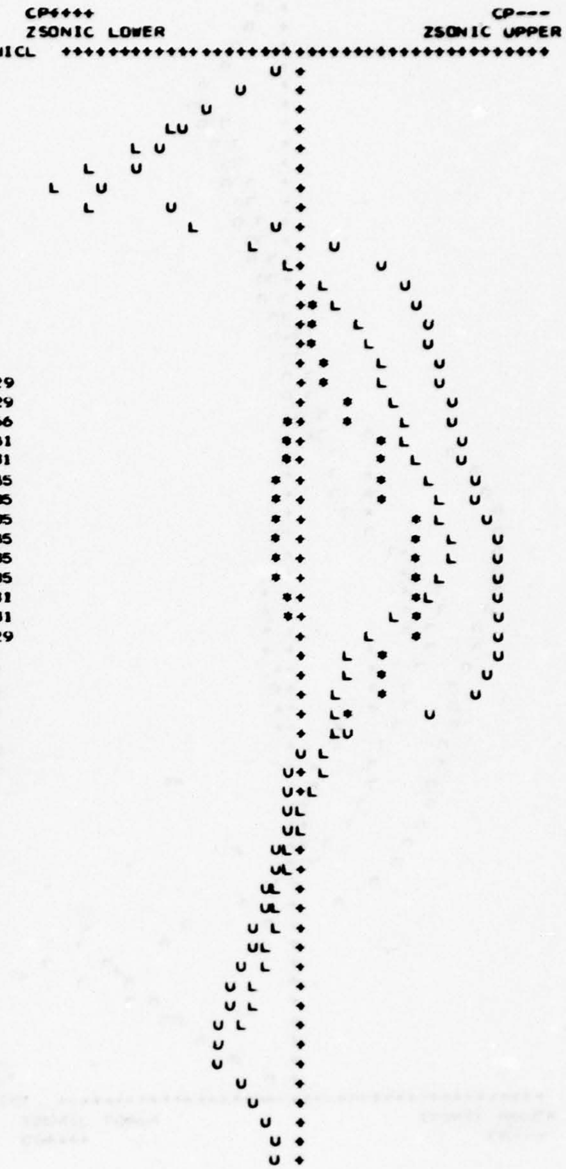
K=12 SPAN STATION ETA= 0.40000 Y= 0.90000

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.2245	-0.2013	0.09121	0.08843	0.857	0.859	-0.003	0.0	0.0
3	0.3179	-0.0881	0.17458	0.17640	0.807	0.805	0.002	0.0	0.0
4	0.3492	-0.0502	0.27671	0.28758	0.739	0.732	0.011	0.0	0.0
5	0.3639	-0.0323	0.36398	0.39524	0.677	0.653	0.031	0.0	0.0
6	0.3733	-0.0210	0.43872	0.50089	0.618	0.564	0.062	0.0	0.0
7	0.3806	-0.0121	0.51084	0.61556	0.555	0.449	0.105	0.0	0.0
8	0.3873	-0.0040	0.58867	0.75320	0.479	0.249	0.165	0.0	0.0
9	0.3939	0.0040	0.40480	0.62216	0.645	0.442	0.217	0.0	0.0
10	0.4005	0.0120	0.06951	0.30937	0.870	0.716	0.240	0.0	0.0
11	0.4072	0.0201	-0.10837	0.13610	0.969	0.830	0.244	0.0	0.0
12	0.4140	0.0283	-0.21894	0.02158	1.025	0.898	0.241	0.029	0.0
13	0.4211	0.0369	-0.28562	-0.05818	1.058	0.942	0.227	0.029	0.0
14	0.4286	0.0461	-0.32608	-0.11553	1.077	0.972	0.211	0.066	0.0
15	0.4369	0.0561	-0.35272	-0.15731	1.089	0.994	0.195	0.066	0.0
16	0.4460	0.0672	-0.37352	-0.19246	1.099	1.012	0.181	0.131	0.0
17	0.4565	0.0799	-0.39241	-0.22278	1.108	1.027	0.170	0.131	0.0
18	0.4687	0.0947	-0.40897	-0.24896	1.115	1.040	0.160	0.235	-0.029
19	0.4831	0.1121	-0.42517	-0.27463	1.123	1.052	0.151	0.394	-0.029
20	0.5000	0.1326	-0.44046	-0.29864	1.130	1.064	0.142	0.394	-0.066
21	0.5196	0.1564	-0.45597	-0.32230	1.137	1.075	0.134	0.394	-0.131
22	0.5417	0.1831	-0.47298	-0.34661	1.144	1.087	0.126	0.631	-0.131
23	0.5655	0.2120	-0.49234	-0.37188	1.153	1.098	0.120	0.631	-0.235
24	0.5902	0.2419	-0.51458	-0.39822	1.163	1.111	0.116	0.631	-0.235
25	0.6149	0.2719	-0.54058	-0.42641	1.174	1.123	0.114	0.973	-0.235
26	0.6393	0.3014	-0.56504	-0.44975	1.184	1.134	0.115	0.973	-0.235
27	0.6631	0.3303	-0.58028	-0.45878	1.191	1.138	0.122	0.973	-0.236
28	0.6865	0.3587	-0.58634	-0.45154	1.194	1.135	0.135	0.973	-0.235
29	0.7097	0.3867	-0.58666	-0.42344	1.194	1.122	0.163	0.973	-0.235
30	0.7327	0.4146	-0.58354	-0.36184	1.192	1.094	0.222	0.973	-0.235
31	0.7557	0.4425	-0.57765	-0.26482	1.190	1.048	0.313	0.973	-0.131
32	0.7788	0.4705	-0.56994	-0.17098	1.187	1.001	0.399	0.973	0.0
33	0.8021	0.4987	-0.56081	-0.12437	1.183	0.977	0.436	0.973	0.0
34	0.8255	0.5272	-0.54256	-0.11113	1.175	0.970	0.431	0.631	0.0
35	0.8493	0.5559	-0.47463	-0.10023	1.145	0.964	0.374	0.631	0.0
36	0.8732	0.5850	-0.28069	-0.08594	1.055	0.957	0.195	0.394	0.0
37	0.8974	0.6143	-0.06143	-0.06879	0.944	0.948	-0.007	0.0	0.0
38	0.9218	0.6439	0.02338	-0.05022	0.897	0.938	-0.074	0.0	0.0
39	0.9464	0.6737	0.02773	-0.03142	0.894	0.927	-0.059	0.0	0.0
40	0.9711	0.7037	0.02921	-0.01278	0.894	0.917	-0.042	0.0	0.0
41	0.9959	0.7336	0.03772	0.00566	0.889	0.907	-0.032	0.0	0.0
42	1.0204	0.7634	0.05387	0.02360	0.879	0.897	-0.030	0.0	0.0
43	1.0446	0.7927	0.07409	0.04036	0.868	0.887	-0.034	0.0	0.0
44	1.0680	0.8211	0.09537	0.05647	0.855	0.878	-0.039	0.0	0.0
45	1.0903	0.8481	0.11587	0.07271	0.843	0.868	-0.043	0.0	0.0
46	1.1113	0.8735	0.13546	0.08956	0.831	0.858	-0.046	0.0	0.0
47	1.1308	0.8972	0.15529	0.10581	0.819	0.849	-0.049	0.0	0.0
48	1.1490	0.9193	0.17581	0.12036	0.806	0.840	-0.055	0.0	0.0
49	1.1662	0.9401	0.19659	0.13329	0.793	0.832	-0.063	0.0	0.0
50	1.1828	0.9603	0.21637	0.14976	0.780	0.822	-0.067	0.0	0.0
51	1.1992	0.9801	0.23556	0.17792	0.767	0.804	-0.058	0.0	0.0
52	1.2156	1.0000	0.25567	0.22945	0.754	0.771	-0.026	0.0	0.0
53	1.2324	1.0204	0.23198	0.23044	0.769	0.770	-0.002	0.0	0.0
54	1.2527	1.0449	0.17635	0.17598	0.805	0.806	-0.000	0.0	0.0
55	1.2837	1.0826	0.13595	0.13587	0.831	0.831	-0.000	0.0	0.0
56	1.3417	1.1529	0.10099	0.10097	0.852	0.852	-0.000	0.0	0.0
57	1.4386	1.2703	0.07370	0.07368	0.868	0.868	-0.000	0.0	0.0
58	1.5439	1.3979	0.05439	0.05226	0.879	0.880	-0.002	0.0	0.0



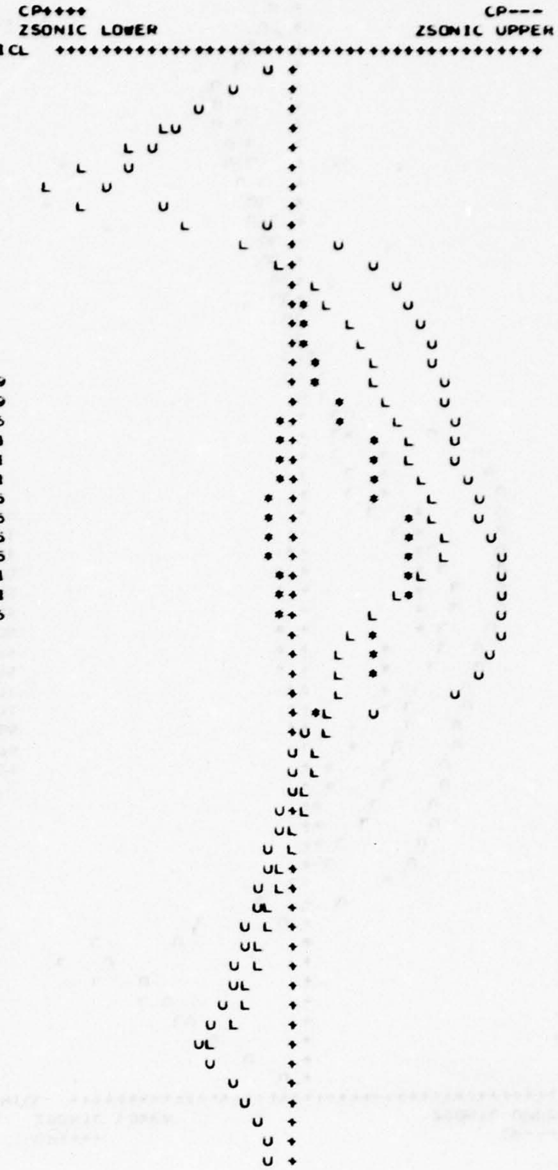
K=13 SPAN STATION ETA= 0.43636 Y= 0.98182

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.2909	-0.2013	0.08156	0.07821	0.863	0.865	-0.003	0.0	0.0
3	0.3812	-0.0881	0.16729	0.16935	0.811	0.810	0.002	0.0	0.0
4	0.4115	-0.0502	0.27037	0.28236	0.744	0.735	0.012	0.0	0.0
5	0.4257	-0.0323	0.35698	0.39065	0.682	0.656	0.034	0.0	0.0
6	0.4347	-0.0210	0.43013	0.49585	0.625	0.569	0.066	0.0	0.0
7	0.4418	-0.0121	0.50000	0.60907	0.565	0.457	0.109	0.0	0.0
8	0.4483	-0.0040	0.57480	0.74396	0.493	0.267	0.169	0.0	0.0
9	0.4547	0.0040	0.39248	0.61519	0.655	0.450	0.223	0.0	0.0
10	0.4610	0.0120	0.06106	0.30770	0.875	0.718	0.247	0.0	0.0
11	0.4675	0.0201	-0.11681	0.13586	0.973	0.831	0.253	0.0	0.0
12	0.4741	0.0283	-0.22793	0.02113	1.030	0.898	0.249	0.029	0.0
13	0.4809	0.0369	-0.29550	-0.05959	1.062	0.943	0.236	0.029	0.0
14	0.4382	0.0461	-0.33757	-0.11813	1.082	0.974	0.219	0.066	0.0
15	0.4962	0.0561	-0.36518	-0.16094	1.095	0.996	0.204	0.066	0.0
16	0.5051	0.0672	-0.38631	-0.19680	1.105	1.014	0.190	0.131	0.0
17	0.5152	0.0799	-0.40530	-0.22751	1.114	1.029	0.178	0.235	0.0
18	0.5270	0.0947	-0.42190	-0.25390	1.121	1.042	0.168	0.235	-0.029
19	0.5409	0.1121	-0.43817	-0.27974	1.129	1.055	0.158	0.394	-0.029
20	0.5572	0.1326	-0.45340	-0.30371	1.136	1.066	0.150	0.394	-0.066
21	0.5762	0.1564	-0.46863	-0.32739	1.142	1.078	0.141	0.631	-0.131
22	0.5976	0.1831	-0.48519	-0.35167	1.150	1.089	0.134	0.631	-0.131
23	0.6206	0.2120	-0.50419	-0.37650	1.158	1.101	0.128	0.631	-0.235
24	0.6445	0.2419	-0.52629	-0.40227	1.168	1.112	0.124	0.631	-0.235
25	0.6684	0.2719	-0.55227	-0.42907	1.179	1.125	0.123	0.973	-0.235
26	0.6919	0.3014	-0.57696	-0.44935	1.190	1.134	0.128	0.973	-0.235
27	0.7150	0.3303	-0.59268	-0.45205	1.196	1.135	0.141	0.973	-0.235
28	0.7376	0.3587	-0.59932	-0.43048	1.199	1.125	0.169	0.973	-0.235
29	0.7600	0.3867	-0.60023	-0.37666	1.199	1.101	0.224	0.973	-0.131
30	0.7822	0.4146	-0.59749	-0.28972	1.198	1.060	0.308	0.973	-0.131
31	0.8045	0.4425	-0.59175	-0.19842	1.196	1.015	0.393	0.973	-0.029
32	0.8268	0.4705	-0.58353	-0.14609	1.192	0.988	0.437	0.631	0.0
33	0.8493	0.4987	-0.56956	-0.13010	1.186	0.980	0.439	0.631	0.0
34	0.8720	0.5272	-0.52559	-0.12014	1.167	0.975	0.405	0.631	0.0
35	0.8950	0.5559	-0.37822	-0.10671	1.101	0.968	0.272	0.394	0.0
36	0.9181	0.5850	-0.13398	-0.09004	0.982	0.959	0.044	0.0	0.0
37	0.9415	0.6143	0.00977	-0.07189	0.905	0.949	-0.082	0.0	0.0
38	0.9651	0.6439	0.02093	-0.05339	0.898	0.939	-0.074	0.0	0.0
39	0.9889	0.6737	0.02045	-0.03483	0.898	0.929	-0.055	0.0	0.0
40	1.0128	0.7037	0.02569	-0.01630	0.896	0.919	-0.042	0.0	0.0
41	1.0367	0.7336	0.03932	0.00213	0.888	0.909	-0.037	0.0	0.0
42	1.0605	0.7634	0.05838	0.01970	0.877	0.899	-0.039	0.0	0.0
43	1.0838	0.7927	0.07831	0.03648	0.865	0.889	-0.042	0.0	0.0
44	1.1065	0.8211	0.09701	0.05251	0.854	0.880	-0.044	0.0	0.0
45	1.1280	0.8481	0.11422	0.06828	0.844	0.871	-0.046	0.0	0.0
46	1.1483	0.8735	0.13091	0.08482	0.834	0.861	-0.046	0.0	0.0
47	1.1672	0.8972	0.14909	0.10110	0.822	0.852	-0.048	0.0	0.0
48	1.1848	0.9193	0.16969	0.11677	0.810	0.842	-0.053	0.0	0.0
49	1.2014	0.9401	0.19188	0.13152	0.796	0.833	-0.060	0.0	0.0
50	1.2175	0.9603	0.21366	0.14969	0.781	0.822	-0.064	0.0	0.0
51	1.2334	0.9801	0.23467	0.17874	0.768	0.804	-0.056	0.0	0.0
52	1.2492	1.0000	0.25874	0.22994	0.752	0.771	-0.029	0.0	0.0
53	1.2655	1.0204	0.23658	0.23155	0.766	0.770	-0.005	0.0	0.0
54	1.2850	1.0449	0.17874	0.17800	0.804	0.804	-0.001	0.0	0.0
55	1.3151	1.0826	0.13742	0.13732	0.830	0.830	-0.000	0.0	0.0
56	1.3712	1.1529	0.10193	0.10192	0.851	0.851	-0.000	0.0	0.0
57	1.4649	1.2703	0.07432	0.07431	0.867	0.867	-0.000	0.0	0.0
58	1.5666	1.3979	0.05425	0.05333	0.879	0.880	-0.001	0.0	0.0



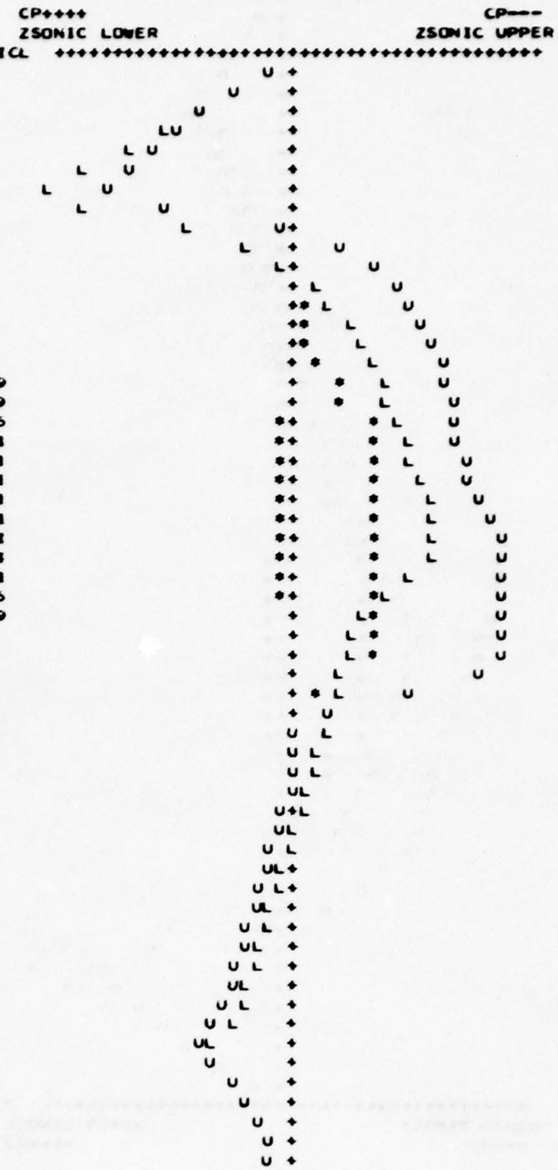
K=14 SPAN STATION ETA= 0.47273 Y= 1.06364

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.3572	-0.2013	0.07544	0.07244	0.867	0.869	-0.003	0.0	0.0
3	0.4445	-0.0881	0.16221	0.16457	0.814	0.813	0.002	0.0	0.0
4	0.4737	-0.0502	0.26605	0.27933	0.747	0.737	0.013	0.0	0.0
5	0.4874	-0.0323	0.35174	0.38813	0.686	0.658	0.036	0.0	0.0
6	0.4961	-0.0210	0.42306	0.49273	0.631	0.572	0.070	0.0	0.0
7	0.5030	-0.0121	0.49047	0.60433	0.574	0.462	0.114	0.0	0.0
8	0.5093	-0.0040	0.56201	0.73631	0.506	0.281	0.174	0.0	0.0
9	0.5154	0.0040	0.38140	0.60998	0.663	0.456	0.229	0.0	0.0
10	0.5216	0.0120	0.05436	0.30820	0.879	0.717	0.254	0.0	0.0
11	0.5278	0.0201	-0.12308	0.13811	0.976	0.829	0.261	0.0	0.0
12	0.5342	0.0283	-0.23461	0.02341	1.033	0.897	0.258	0.029	0.0
13	0.5408	0.0369	-0.30303	-0.05812	1.066	0.942	0.245	0.029	0.0
14	0.5479	0.0461	-0.34657	-0.11760	1.087	0.974	0.229	0.066	0.0
15	0.5555	0.0561	-0.37515	-0.16162	1.100	0.996	0.214	0.066	0.0
16	0.5641	0.0672	-0.39671	-0.19821	1.110	1.015	0.198	0.131	0.0
17	0.5739	0.0799	-0.41597	-0.22948	1.119	1.030	0.186	0.235	0.0
18	0.5853	0.0947	-0.43273	-0.25629	1.126	1.043	0.176	0.235	-0.029
19	0.5987	0.1121	-0.44908	-0.28236	1.134	1.056	0.167	0.394	-0.029
20	0.6145	0.1326	-0.46431	-0.30647	1.140	1.068	0.158	0.394	-0.066
21	0.6328	0.1564	-0.47946	-0.33027	1.147	1.079	0.149	0.631	-0.131
22	0.6534	0.1831	-0.49611	-0.35415	1.154	1.090	0.142	0.631	-0.131
23	0.6757	0.2120	-0.51496	-0.37797	1.163	1.101	0.137	0.631	-0.131
24	0.6987	0.2419	-0.53685	-0.40222	1.172	1.112	0.135	0.631	-0.235
25	0.7218	0.2719	-0.56298	-0.42605	1.184	1.123	0.137	0.973	-0.235
26	0.7446	0.3014	-0.58806	-0.44004	1.194	1.130	0.148	0.973	-0.235
27	0.7668	0.3303	-0.60442	-0.43020	1.201	1.125	0.174	0.973	-0.235
28	0.7887	0.3587	-0.61178	-0.38795	1.204	1.106	0.224	0.973	-0.131
29	0.8103	0.3867	-0.61322	-0.31366	1.205	1.071	0.300	0.973	-0.131
30	0.8318	0.4146	-0.61064	-0.22984	1.204	1.031	0.381	0.631	-0.066
31	0.8533	0.4425	-0.60435	-0.17302	1.201	1.002	0.431	0.631	0.0
32	0.8749	0.4705	-0.59299	-0.15138	1.196	0.991	0.442	0.631	0.0
33	0.8966	0.4987	-0.56507	-0.14134	1.184	0.986	0.424	0.631	0.0
34	0.9185	0.5272	-0.46705	-0.12814	1.142	0.979	0.339	0.394	0.0
35	0.9407	0.5559	-0.23292	-0.11187	1.032	0.971	0.121	0.235	0.0
36	0.9631	0.5850	-0.02913	-0.09395	0.926	0.961	-0.065	0.0	0.0
37	0.9857	0.6143	0.01581	-0.07569	0.901	0.951	-0.092	0.0	0.0
38	1.0085	0.6439	0.01258	-0.05729	0.903	0.941	-0.070	0.0	0.0
39	1.0314	0.6737	0.01473	-0.03862	0.902	0.931	-0.053	0.0	0.0
40	1.0545	0.7037	0.02445	-0.01993	0.896	0.921	-0.044	0.0	0.0
41	1.0776	0.7336	0.04091	-0.00142	0.887	0.911	-0.042	0.0	0.0
42	1.1005	0.7634	0.06091	0.01636	0.875	0.901	-0.045	0.0	0.0
43	1.1231	0.7927	0.07973	0.03325	0.864	0.891	-0.046	0.0	0.0
44	1.1449	0.8211	0.09644	0.04945	0.854	0.882	-0.047	0.0	0.0
45	1.1658	0.8481	0.11143	0.06528	0.845	0.873	-0.046	0.0	0.0
46	1.1854	0.8735	0.12678	0.08161	0.836	0.863	-0.045	0.0	0.0
47	1.2036	0.8972	0.14417	0.09850	0.825	0.853	-0.046	0.0	0.0
48	1.2206	0.9193	0.16385	0.11550	0.813	0.843	-0.048	0.0	0.0
49	1.2367	0.9401	0.18575	0.13174	0.799	0.833	-0.054	0.0	0.0
50	1.2522	0.9603	0.20725	0.15126	0.786	0.821	-0.056	0.0	0.0
51	1.2675	0.9801	0.22691	0.18135	0.773	0.802	-0.046	0.0	0.0
52	1.2828	1.0000	0.25795	0.23323	0.752	0.769	-0.025	0.0	0.0
53	1.2985	1.0204	0.24201	0.23462	0.763	0.768	-0.007	0.0	0.0
54	1.3174	1.0449	0.18144	0.18043	0.802	0.803	-0.001	0.0	0.0
55	1.3464	1.0826	0.13889	0.13879	0.829	0.829	-0.000	0.0	0.0
56	1.4006	1.1529	0.10289	0.10288	0.851	0.851	-0.000	0.0	0.0
57	1.4911	1.2703	0.07506	0.07506	0.867	0.867	-0.000	0.0	0.0
58	1.5894	1.3979	0.05552	0.05401	0.878	0.879	-0.002	0.0	0.0



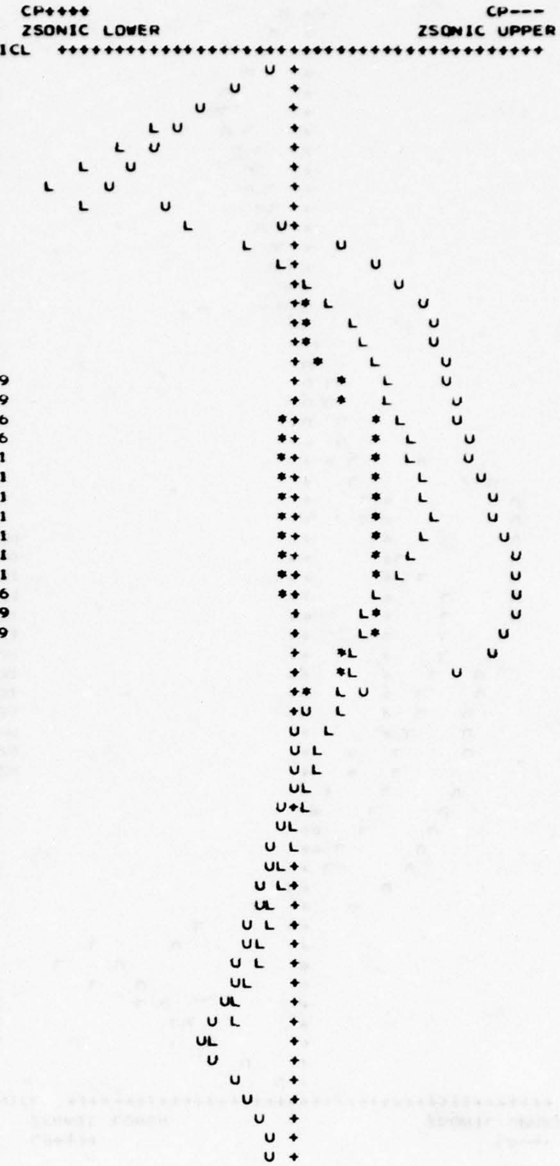
K=15 SPAN STATION ETA= 0.50909 Y= 1.14545

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.4236	-0.2013	0.06918	0.06581	0.870	0.872	-0.003	0.0	0.0
3	0.5077	-0.0881	0.15957	0.16227	0.816	0.814	0.003	0.0	0.0
4	0.5359	-0.0502	0.26396	0.27872	0.748	0.738	0.015	0.0	0.0
5	0.5492	-0.0323	0.34834	0.38780	0.688	0.658	0.039	0.0	0.0
6	0.5576	-0.0210	0.41751	0.49157	0.635	0.573	0.074	0.0	0.0
7	0.5642	-0.0121	0.48219	0.60136	0.581	0.465	0.119	0.0	0.0
8	0.5702	-0.0040	0.55023	0.73024	0.518	0.292	0.180	0.0	0.0
9	0.5762	0.0040	0.37145	0.60648	0.671	0.459	0.235	0.0	0.0
10	0.5821	0.0120	0.04922	0.31079	0.882	0.715	0.262	0.0	0.0
11	0.5881	0.0201	-0.12742	0.14269	0.979	0.826	0.270	0.0	0.0
12	0.5943	0.0283	-0.23931	0.02819	1.035	0.894	0.268	0.029	0.0
13	0.6007	0.0369	-0.30865	-0.05407	1.069	0.940	0.255	0.029	0.0
14	0.6075	0.0461	-0.35361	-0.11487	1.090	0.972	0.239	0.066	0.0
15	0.6149	0.0561	-0.38329	-0.15978	1.104	0.995	0.224	0.066	0.0
16	0.6232	0.0672	-0.40556	-0.19745	1.114	1.014	0.208	0.131	0.0
17	0.6326	0.0799	-0.42531	-0.22949	1.123	1.030	0.196	0.235	0.0
18	0.6436	0.0947	-0.44230	-0.25660	1.131	1.044	0.186	0.394	-0.029
19	0.6565	0.1121	-0.45864	-0.28282	1.138	1.056	0.176	0.394	-0.029
20	0.6718	0.1326	-0.47397	-0.30713	1.145	1.068	0.167	0.631	-0.066
21	0.6894	0.1564	-0.48946	-0.33066	1.152	1.079	0.159	0.631	-0.131
22	0.7093	0.1831	-0.50639	-0.35351	1.159	1.090	0.153	0.631	-0.131
23	0.7308	0.2120	-0.52527	-0.37558	1.167	1.100	0.150	0.631	-0.131
24	0.7530	0.2419	-0.54712	-0.39654	1.177	1.110	0.151	0.631	-0.131
25	0.7753	0.2719	-0.57323	-0.41450	1.188	1.118	0.159	0.631	-0.131
26	0.7972	0.3014	-0.59849	-0.41830	1.199	1.120	0.180	0.631	-0.131
27	0.8187	0.3303	-0.61519	-0.39280	1.206	1.108	0.222	0.631	-0.131
28	0.8398	0.3587	-0.62275	-0.33526	1.209	1.081	0.287	0.631	-0.131
29	0.8606	0.3867	-0.62413	-0.26239	1.210	1.046	0.362	0.631	-0.066
30	0.8814	0.4146	-0.62142	-0.20495	1.208	1.018	0.416	0.631	-0.029
31	0.9021	0.4425	-0.61414	-0.17673	1.205	1.004	0.437	0.631	0.0
32	0.9229	0.4705	-0.59573	-0.16373	1.198	0.997	0.432	0.631	0.0
33	0.9439	0.4987	-0.53477	-0.15048	1.171	0.991	0.384	0.394	0.0
34	0.9650	0.5272	-0.35167	-0.13413	1.089	0.982	0.218	0.235	0.0
35	0.9864	0.5559	-0.10433	-0.11632	0.967	0.973	-0.012	0.0	0.0
36	1.0080	0.5850	0.00881	-0.09802	0.905	0.963	-0.107	0.0	0.0
37	1.0298	0.6143	0.00664	-0.07962	0.906	0.953	-0.086	0.0	0.0
38	1.0518	0.6439	0.00354	-0.06092	0.908	0.943	-0.064	0.0	0.0
39	1.0739	0.6737	0.00956	-0.04207	0.905	0.933	-0.052	0.0	0.0
40	1.0962	0.7037	0.02341	-0.02317	0.897	0.923	-0.047	0.0	0.0
41	1.1184	0.7336	0.04155	-0.00423	0.886	0.912	-0.046	0.0	0.0
42	1.1406	0.7634	0.06108	0.01402	0.875	0.902	-0.047	0.0	0.0
43	1.1623	0.7927	0.07900	0.03112	0.865	0.892	-0.048	0.0	0.0
44	1.1834	0.8211	0.09442	0.04762	0.856	0.883	-0.047	0.0	0.0
45	1.2035	0.8481	0.10852	0.06409	0.847	0.873	-0.044	0.0	0.0
46	1.2224	0.8735	0.12353	0.08098	0.838	0.864	-0.043	0.0	0.0
47	1.2400	0.8972	0.14056	0.09851	0.828	0.853	-0.042	0.0	0.0
48	1.2564	0.9193	0.15988	0.11616	0.816	0.843	-0.044	0.0	0.0
49	1.2719	0.9401	0.18147	0.13281	0.802	0.832	-0.049	0.0	0.0
50	1.2869	0.9603	0.20315	0.15257	0.788	0.820	-0.051	0.0	0.0
51	1.3016	0.9801	0.22426	0.18273	0.775	0.801	-0.042	0.0	0.0
52	1.3164	1.0000	0.25769	0.23420	0.752	0.768	-0.023	0.0	0.0
53	1.3316	1.0204	0.24305	0.23555	0.762	0.767	-0.008	0.0	0.0
54	1.3498	1.0449	0.18247	0.18138	0.802	0.802	-0.001	0.0	0.0
55	1.3778	1.0826	0.13985	0.13975	0.828	0.828	-0.000	0.0	0.0
56	1.4300	1.1529	0.10378	0.10377	0.850	0.850	-0.000	0.0	0.0
57	1.5173	1.2703	0.07581	0.07581	0.867	0.867	-0.000	0.0	0.0
58	1.6121	1.3979	0.05601	0.05406	0.878	0.879	-0.002	0.0	0.0



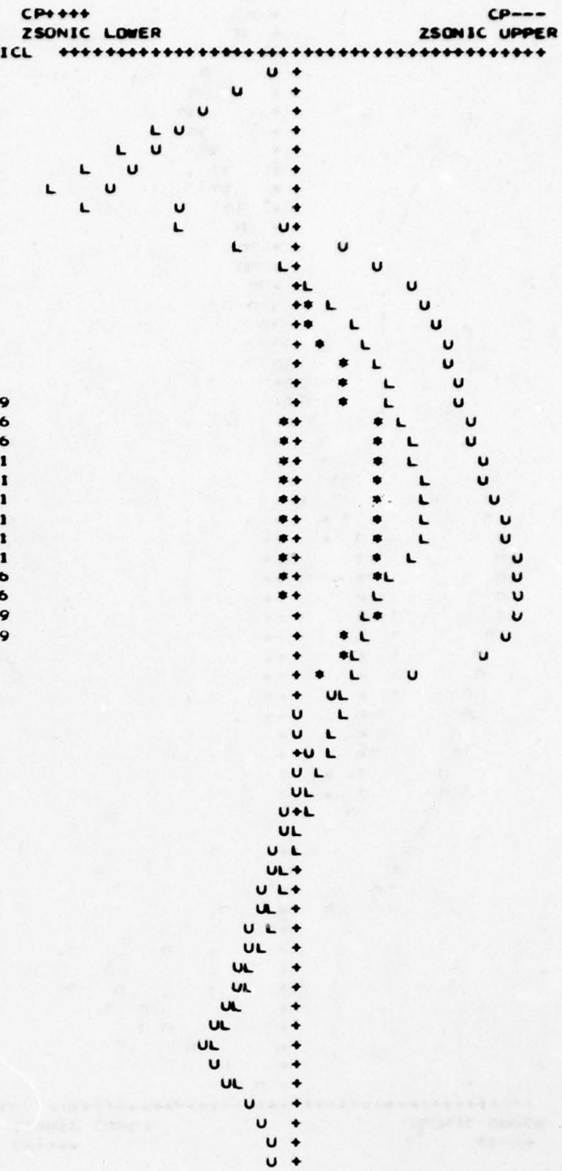
K=16 SPAN STATION ETA= 0.54545 Y= 1.22727

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.4899	-0.2013	0.06990	0.06522	0.870	0.873	-0.005	0.0	0.0
3	0.5710	-0.0881	0.15968	0.16279	0.816	0.814	0.003	0.0	0.0
4	0.5982	-0.0502	0.26333	0.27982	0.748	0.737	0.016	0.0	0.0
5	0.6109	-0.0323	0.34589	0.38879	0.690	0.658	0.043	0.0	0.0
6	0.6190	-0.0210	0.41260	0.49151	0.639	0.573	0.079	0.0	0.0
7	0.6254	-0.0121	0.47432	0.59932	0.588	0.467	0.125	0.0	0.0
8	0.6312	-0.0040	0.53869	0.72497	0.529	0.301	0.186	0.0	0.0
9	0.6370	0.0040	0.36177	0.60387	0.678	0.462	0.242	0.0	0.0
10	0.6427	0.0120	0.04452	0.31449	0.885	0.713	0.270	0.0	0.0
11	0.6485	0.0201	-0.13120	0.14854	0.981	0.823	0.280	0.0	0.0
12	0.6544	0.0283	-0.24346	0.03435	1.037	0.891	0.278	0.029	0.0
13	0.6605	0.0369	-0.31378	-0.04858	1.071	0.937	0.265	0.029	0.0
14	0.6671	0.0461	-0.36027	-0.11049	1.093	0.970	0.250	0.066	0.0
15	0.6742	0.0561	-0.39115	-0.15652	1.107	0.994	0.235	0.066	0.0
16	0.6822	0.0672	-0.41413	-0.19520	1.118	1.013	0.219	0.131	0.0
17	0.6913	0.0799	-0.43439	-0.22798	1.127	1.030	0.206	0.235	0.0
18	0.7019	0.0947	-0.45176	-0.25542	1.135	1.043	0.196	0.394	-0.029
19	0.7143	0.1121	-0.46842	-0.28194	1.142	1.056	0.186	0.394	-0.029
20	0.7290	0.1326	-0.48404	-0.30593	1.149	1.067	0.178	0.631	-0.066
21	0.7460	0.1564	-0.49971	-0.32796	1.156	1.078	0.172	0.631	-0.066
22	0.7652	0.1831	-0.51658	-0.34873	1.163	1.088	0.168	0.631	-0.131
23	0.7859	0.2120	-0.53543	-0.36769	1.172	1.096	0.168	0.631	-0.131
24	0.8073	0.2419	-0.55727	-0.38344	1.181	1.104	0.174	0.631	-0.131
25	0.8287	0.2719	-0.58317	-0.39332	1.192	1.108	0.190	0.631	-0.131
26	0.8499	0.3014	-0.60834	-0.38605	1.203	1.105	0.222	0.631	-0.131
27	0.8706	0.3303	-0.62489	-0.35048	1.210	1.088	0.274	0.631	-0.131
28	0.8909	0.3587	-0.63236	-0.29408	1.213	1.062	0.338	0.631	-0.131
29	0.9110	0.3867	-0.63413	-0.24021	1.214	1.036	0.394	0.631	-0.066
30	0.9309	0.4146	-0.63098	-0.20643	1.212	1.019	0.425	0.631	-0.029
31	0.9509	0.4425	-0.61935	-0.18838	1.208	1.010	0.431	0.631	-0.029
32	0.9709	0.4705	-0.58290	-0.17331	1.192	1.002	0.410	0.394	0.0
33	0.9911	0.4987	-0.46312	-0.15629	1.140	0.994	0.307	0.394	0.0
34	1.0115	0.5272	-0.21018	-0.13831	1.021	0.984	0.072	0.131	0.0
35	1.0321	0.5559	-0.02068	-0.12015	0.921	0.975	-0.099	0.0	0.0
36	1.0529	0.5850	0.00227	-0.10183	0.909	0.965	-0.104	0.0	0.0
37	1.0739	0.6143	-0.00556	-0.08314	0.913	0.955	-0.078	0.0	0.0
38	1.0951	0.6439	-0.00521	-0.06411	0.913	0.945	-0.059	0.0	0.0
39	1.1164	0.6737	0.00472	-0.04504	0.907	0.935	-0.050	0.0	0.0
40	1.1379	0.7037	0.02133	-0.02558	0.898	0.924	-0.047	0.0	0.0
41	1.1593	0.7336	0.04057	-0.00602	0.887	0.913	-0.047	0.0	0.0
42	1.1806	0.7634	0.05979	0.01265	0.876	0.903	-0.047	0.0	0.0
43	1.2016	0.7927	0.07663	0.03029	0.866	0.893	-0.046	0.0	0.0
44	1.2219	0.8211	0.09133	0.04751	0.857	0.883	-0.044	0.0	0.0
45	1.2413	0.8481	0.10536	0.06462	0.849	0.873	-0.041	0.0	0.0
46	1.2595	0.8735	0.12048	0.08172	0.840	0.863	-0.039	0.0	0.0
47	1.2764	0.8972	0.13763	0.09932	0.829	0.853	-0.038	0.0	0.0
48	1.2922	0.9193	0.15679	0.11718	0.818	0.842	-0.040	0.0	0.0
49	1.3071	0.9401	0.17806	0.13396	0.804	0.832	-0.044	0.0	0.0
50	1.3216	0.9603	0.19979	0.15388	0.790	0.819	-0.046	0.0	0.0
51	1.3358	0.9801	0.22183	0.18421	0.776	0.800	-0.038	0.0	0.0
52	1.3500	1.0000	0.25676	0.23548	0.753	0.767	-0.021	0.0	0.0
53	1.3646	1.0204	0.24340	0.23652	0.762	0.766	-0.007	0.0	0.0
54	1.3822	1.0449	0.18334	0.18230	0.801	0.802	-0.001	0.0	0.0
55	1.4091	1.0826	0.14071	0.14061	0.828	0.828	-0.000	0.0	0.0
56	1.4595	1.1529	0.10461	0.10460	0.850	0.850	-0.000	0.0	0.0
57	1.5435	1.2703	0.07652	0.07651	0.866	0.866	-0.000	0.0	0.0
58	1.6349	1.3979	0.05660	0.05381	0.878	0.879	-0.003	0.0	0.0



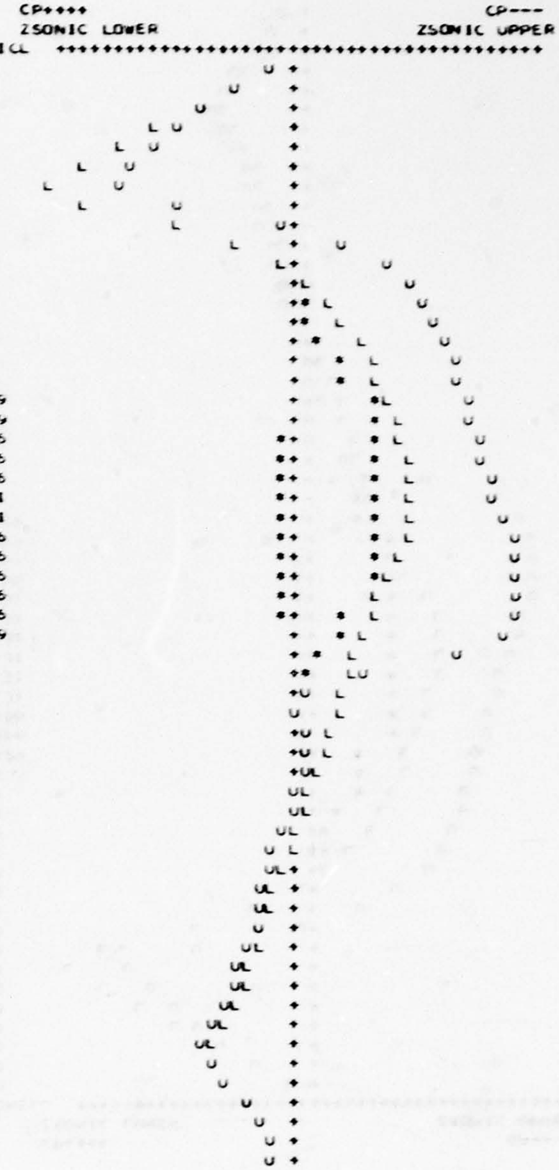
K=17 SPAN STATION ETA= 0.58182 Y= 1.30909

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.5563	-0.2013	0.07036	0.06563	0.870	0.873	-0.005	0.0	0.0
3	0.6343	-0.0881	0.15891	0.16253	0.816	0.814	0.004	0.0	0.0
4	0.6604	-0.0502	0.26165	0.28011	0.750	0.737	0.018	0.0	0.0
5	0.6727	-0.0323	0.34234	0.38914	0.693	0.657	0.047	0.0	0.0
6	0.6805	-0.0210	0.40654	0.49090	0.644	0.573	0.084	0.0	0.0
7	0.6866	-0.0121	0.46527	0.59680	0.596	0.470	0.132	0.0	0.0
8	0.6922	-0.0040	0.52593	0.71932	0.541	0.310	0.193	0.0	0.0
9	0.6977	0.0040	0.35082	0.60100	0.686	0.465	0.250	0.0	0.0
10	0.7032	0.0120	0.03852	0.31808	0.888	0.710	0.280	0.0	0.0
11	0.7088	0.0201	-0.13629	0.15445	0.983	0.819	0.291	0.0	0.0
12	0.7145	0.0283	-0.24876	0.04076	1.040	0.887	0.290	0.029	0.0
13	0.7204	0.0369	-0.31989	-0.04265	1.074	0.934	0.277	0.029	0.0
14	0.7267	0.0461	-0.36791	-0.10551	1.097	0.967	0.262	0.066	0.0
15	0.7336	0.0561	-0.40005	-0.15253	1.111	0.992	0.248	0.131	0.0
16	0.7412	0.0672	-0.42381	-0.19192	1.122	1.012	0.232	0.235	0.0
17	0.7500	0.0799	-0.44460	-0.22512	1.132	1.028	0.219	0.394	0.0
18	0.7602	0.0947	-0.46223	-0.25258	1.139	1.042	0.210	0.394	0.0
19	0.7722	0.1121	-0.47891	-0.27848	1.147	1.054	0.200	0.394	-0.029
20	0.7863	0.1326	-0.49453	-0.30127	1.154	1.065	0.193	0.631	-0.066
21	0.8026	0.1564	-0.51018	-0.32141	1.161	1.075	0.189	0.631	-0.066
22	0.8211	0.1831	-0.52688	-0.33902	1.168	1.083	0.188	0.631	-0.131
23	0.8410	0.2120	-0.54531	-0.35341	1.176	1.090	0.192	0.631	-0.131
24	0.8616	0.2419	-0.56665	-0.36327	1.185	1.094	0.203	0.631	-0.131
25	0.8822	0.2719	-0.59206	-0.36632	1.196	1.096	0.226	0.631	-0.131
26	0.9025	0.3014	-0.61682	-0.35380	1.207	1.090	0.263	0.631	-0.131
27	0.9224	0.3303	-0.63343	-0.31965	1.213	1.074	0.314	0.631	-0.131
28	0.9420	0.3587	-0.64081	-0.27567	1.217	1.053	0.365	0.631	-0.066
29	0.9613	0.3867	-0.64123	-0.23925	1.217	1.035	0.402	0.631	-0.066
30	0.9805	0.4146	-0.63478	-0.21523	1.214	1.023	0.420	0.631	-0.029
31	0.9997	0.4425	-0.61338	-0.19661	1.205	1.014	0.417	0.394	-0.029
32	1.0190	0.4705	-0.54160	-0.17840	1.174	1.005	0.363	0.394	0.0
33	1.0384	0.4987	-0.34252	-0.16002	1.085	0.995	0.183	0.235	0.0
34	1.0580	0.5272	-0.09861	-0.14169	0.964	0.986	-0.043	0.0	0.0
35	1.0778	0.5559	-0.00235	-0.12354	0.911	0.977	-0.121	0.0	0.0
36	1.0978	0.5850	-0.01181	-0.10517	0.917	0.967	-0.093	0.0	0.0
37	1.1180	0.6143	-0.01725	-0.08630	0.920	0.957	-0.069	0.0	0.0
38	1.1384	0.6439	-0.01260	-0.06703	0.917	0.947	-0.054	0.0	0.0
39	1.1589	0.6737	0.00020	-0.04732	0.910	0.936	-0.048	0.0	0.0
40	1.1795	0.7037	0.01791	-0.02702	0.900	0.925	-0.045	0.0	0.0
41	1.2002	0.7336	0.03794	-0.00684	0.889	0.914	-0.045	0.0	0.0
42	1.2207	0.7634	0.05668	0.01243	0.878	0.903	-0.044	0.0	0.0
43	1.2408	0.7927	0.07280	0.03074	0.868	0.893	-0.042	0.0	0.0
44	1.2604	0.8211	0.08756	0.04842	0.860	0.883	-0.039	0.0	0.0
45	1.2790	0.8481	0.10206	0.06575	0.851	0.872	-0.036	0.0	0.0
46	1.2965	0.8735	0.11775	0.08303	0.842	0.862	-0.035	0.0	0.0
47	1.3128	0.8972	0.13524	0.10086	0.831	0.852	-0.034	0.0	0.0
48	1.3280	0.9193	0.15453	0.11883	0.819	0.841	-0.036	0.0	0.0
49	1.3424	0.9401	0.17558	0.13560	0.806	0.831	-0.040	0.0	0.0
50	1.3562	0.9603	0.19731	0.15556	0.792	0.818	-0.042	0.0	0.0
51	1.3699	0.9801	0.22014	0.18595	0.777	0.799	-0.034	0.0	0.0
52	1.3836	1.0000	0.25592	0.23699	0.753	0.766	-0.019	0.0	0.0
53	1.3977	1.0204	0.24355	0.23771	0.762	0.766	-0.006	0.0	0.0
54	1.4145	1.0449	0.18429	0.18335	0.800	0.801	-0.001	0.0	0.0
55	1.4404	1.0826	0.14159	0.14150	0.827	0.827	-0.000	0.0	0.0
56	1.4889	1.1529	0.10543	0.10543	0.849	0.849	-0.000	0.0	0.0
57	1.5698	1.2703	0.07725	0.07724	0.866	0.866	-0.000	0.0	0.0
58	1.6576	1.3979	0.05774	0.05348	0.877	0.880	-0.004	0.0	0.0



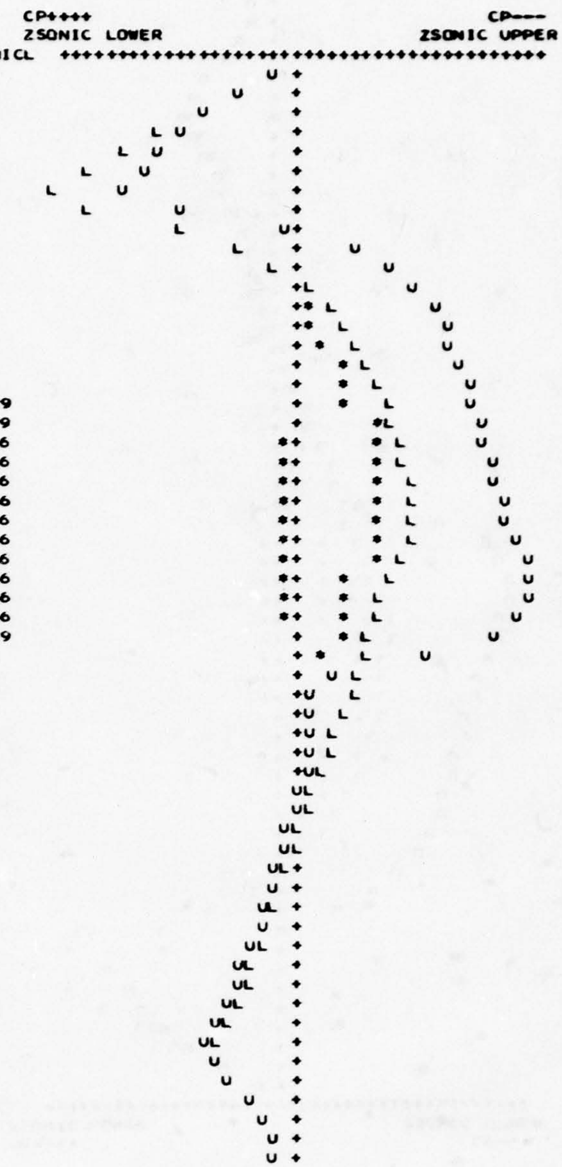
K=16 SPAN STATION ETA= 0.61818 Y= 1.39091

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.6227	-0.2013	0.06876	0.06384	0.871	0.874	-0.005	0.0	0.0
3	0.6976	-0.0861	0.15616	0.16037	0.818	0.815	0.004	0.0	0.0
4	0.7227	-0.0502	0.25860	0.27939	0.752	0.737	0.021	0.0	0.0
5	0.7345	-0.0323	0.33750	0.38881	0.696	0.658	0.051	0.0	0.0
6	0.7419	-0.0210	0.39914	0.46975	0.650	0.574	0.091	0.0	0.0
7	0.7478	-0.0121	0.45478	0.59383	0.604	0.473	0.139	0.0	0.0
8	0.7532	-0.0040	0.51162	0.71333	0.555	0.320	0.202	0.0	0.0
9	0.7585	0.0040	0.33827	0.59804	0.696	0.469	0.260	0.0	0.0
10	0.7638	0.0120	0.03100	0.32194	0.892	0.707	0.291	0.0	0.0
11	0.7691	0.0201	-0.14278	0.16097	0.987	0.815	0.304	0.0	0.0
12	0.7746	0.0283	-0.25519	0.04814	1.043	0.883	0.303	0.029	0.0
13	0.7803	0.0369	-0.32690	-0.03539	1.077	0.930	0.292	0.029	0.0
14	0.7863	0.0461	-0.37640	-0.09882	1.100	0.964	0.278	0.066	0.0
15	0.7929	0.0561	-0.40970	-0.14642	1.116	0.988	0.263	0.131	0.0
16	0.8003	0.0672	-0.43402	-0.18600	1.127	1.009	0.248	0.235	0.0
17	0.8087	0.0799	-0.45508	-0.21928	1.136	1.025	0.236	0.394	0.0
18	0.8185	0.0947	-0.47278	-0.24643	1.144	1.039	0.226	0.394	0.0
19	0.8300	0.1121	-0.48935	-0.27117	1.152	1.051	0.218	0.631	-0.029
20	0.8435	0.1326	-0.50491	-0.29217	1.158	1.061	0.213	0.631	-0.029
21	0.8592	0.1564	-0.52042	-0.30980	1.165	1.069	0.211	0.631	-0.066
22	0.8769	0.1831	-0.53649	-0.32405	1.172	1.076	0.212	0.631	-0.066
23	0.8961	0.2120	-0.55403	-0.33457	1.180	1.081	0.219	0.631	-0.066
24	0.9158	0.2419	-0.57468	-0.34085	1.189	1.084	0.234	0.631	-0.131
25	0.9357	0.2719	-0.59943	-0.34221	1.199	1.085	0.257	0.631	-0.131
26	0.9552	0.3014	-0.62346	-0.33194	1.209	1.080	0.292	0.631	-0.066
27	0.9743	0.3303	-0.63913	-0.30552	1.216	1.067	0.334	0.631	-0.066
28	0.9931	0.3587	-0.64557	-0.27265	1.219	1.051	0.373	0.631	-0.066
29	1.0116	0.3867	-0.64468	-0.24412	1.218	1.038	0.401	0.631	-0.066
30	1.0301	0.4146	-0.63321	-0.22123	1.213	1.026	0.412	0.394	-0.066
31	1.0485	0.4425	-0.59270	-0.20056	1.196	1.016	0.392	0.394	-0.029
32	1.0670	0.4705	-0.46482	-0.18101	1.141	1.006	0.264	0.235	0.0
33	1.0857	0.4987	-0.21113	-0.16259	1.021	0.997	0.049	0.131	0.0
34	1.1045	0.5272	-0.03096	-0.14494	0.927	0.986	-0.114	0.0	0.0
35	1.1235	0.5559	-0.01608	-0.12729	0.919	0.979	-0.111	0.0	0.0
36	1.1427	0.5850	-0.02814	-0.10889	0.926	0.969	-0.081	0.0	0.0
37	1.1621	0.6143	-0.02974	-0.08970	0.926	0.959	-0.060	0.0	0.0
38	1.1817	0.6439	-0.02093	-0.06938	0.922	0.948	-0.048	0.0	0.0
39	1.2014	0.6737	-0.00541	-0.04839	0.913	0.937	-0.043	0.0	0.0
40	1.2212	0.7037	0.01350	-0.02731	0.902	0.925	-0.041	0.0	0.0
41	1.2410	0.7336	0.03364	-0.00645	0.891	0.914	-0.040	0.0	0.0
42	1.2607	0.7634	0.05227	0.01341	0.880	0.902	-0.039	0.0	0.0
43	1.2801	0.7927	0.06862	0.03196	0.871	0.892	-0.037	0.0	0.0
44	1.2989	0.8211	0.08369	0.04978	0.862	0.882	-0.034	0.0	0.0
45	1.3168	0.8481	0.09910	0.06735	0.853	0.872	-0.032	0.0	0.0
46	1.3336	0.8735	0.11551	0.08494	0.843	0.861	-0.031	0.0	0.0
47	1.3492	0.8972	0.13355	0.10301	0.832	0.850	-0.031	0.0	0.0
48	1.3638	0.9193	0.15310	0.12104	0.820	0.840	-0.032	0.0	0.0
49	1.3776	0.9401	0.17410	0.13782	0.807	0.829	-0.036	0.0	0.0
50	1.3909	0.9603	0.19593	0.15779	0.793	0.817	-0.038	0.0	0.0
51	1.4041	0.9801	0.21955	0.18812	0.778	0.798	-0.031	0.0	0.0
52	1.4172	1.0000	0.25567	0.23864	0.754	0.765	-0.017	0.0	0.0
53	1.4307	1.0204	0.24376	0.23885	0.762	0.765	-0.005	0.0	0.0
54	1.4469	1.0449	0.18515	0.18432	0.800	0.800	-0.001	0.0	0.0
55	1.4718	1.0826	0.14241	0.14233	0.827	0.827	-0.000	0.0	0.0
56	1.5183	1.1529	0.10632	0.10632	0.848	0.848	-0.000	0.0	0.0
57	1.5960	1.2703	0.07814	0.07812	0.865	0.865	-0.000	0.0	0.0
58	1.6804	1.3979	0.05952	0.05291	0.876	0.880	-0.007	0.0	0.0



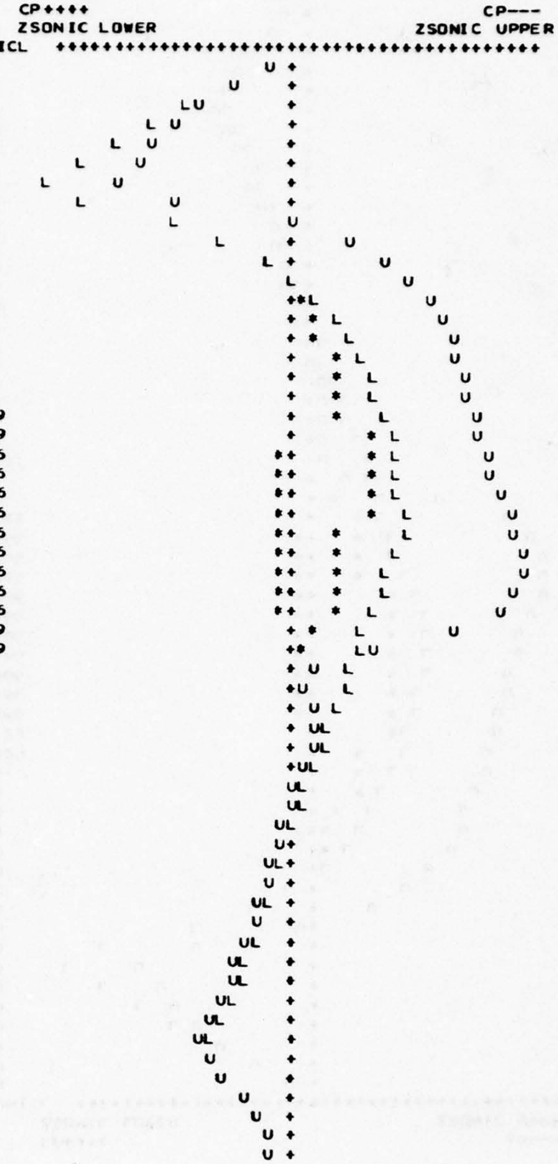
K=19 SPAN STATION ETA= 0.65455 Y= 1.47273

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.6890	-0.2013	0.06288	0.05628	0.874	0.878	-0.007	0.0	0.0
3	0.7608	-0.0881	0.15292	0.15786	0.820	0.817	0.005	0.0	0.0
4	0.7849	-0.0502	0.25571	0.27929	0.754	0.738	0.024	0.0	0.0
5	0.7962	-0.0323	0.33266	0.38925	0.700	0.657	0.057	0.0	0.0
6	0.8034	-0.0210	0.39150	0.48938	0.656	0.575	0.098	0.0	0.0
7	0.8090	-0.0121	0.44381	0.59165	0.614	0.476	0.148	0.0	0.0
8	0.8142	-0.0040	0.49654	0.70813	0.568	0.328	0.212	0.0	0.0
9	0.8192	0.0040	0.32499	0.59623	0.705	0.471	0.271	0.0	0.0
10	0.8243	0.0120	0.02311	0.32758	0.897	0.703	0.304	0.0	0.0
11	0.8294	0.0201	-0.14929	0.16985	0.990	0.809	0.319	0.0	0.0
12	0.8347	0.0283	-0.26134	0.05841	1.046	0.877	0.320	0.029	0.0
13	0.8401	0.0369	-0.33339	-0.02476	1.080	0.924	0.309	0.029	0.0
14	0.8459	0.0461	-0.38420	-0.08833	1.104	0.958	0.296	0.066	0.0
15	0.8523	0.0561	-0.41863	-0.13619	1.120	0.983	0.282	0.131	0.0
16	0.8593	0.0672	-0.44350	-0.17577	1.131	1.003	0.268	0.235	0.0
17	0.8674	0.0799	-0.46469	-0.20906	1.141	1.020	0.256	0.394	0.0
18	0.8768	0.0947	-0.48242	-0.23584	1.148	1.033	0.247	0.394	0.0
19	0.8878	0.1121	-0.49892	-0.25932	1.156	1.045	0.240	0.394	-0.029
20	0.9008	0.1326	-0.51399	-0.27862	1.162	1.054	0.235	0.631	-0.029
21	0.9159	0.1564	-0.52880	-0.29444	1.169	1.062	0.234	0.631	-0.066
22	0.9328	0.1831	-0.54423	-0.30703	1.176	1.068	0.237	0.631	-0.066
23	0.9511	0.2120	-0.56103	-0.31628	1.183	1.072	0.245	0.631	-0.066
24	0.9701	0.2419	-0.58080	-0.32264	1.191	1.075	0.258	0.631	-0.066
25	0.9891	0.2719	-0.60461	-0.32622	1.201	1.077	0.278	0.631	-0.066
26	1.0078	0.3014	-0.62771	-0.32069	1.211	1.074	0.307	0.631	-0.066
27	1.0262	0.3303	-0.64249	-0.30084	1.217	1.065	0.342	0.631	-0.066
28	1.0442	0.3587	-0.64747	-0.27351	1.219	1.052	0.374	0.394	-0.066
29	1.0619	0.3867	-0.64303	-0.24685	1.218	1.039	0.396	0.394	-0.066
30	1.0796	0.4146	-0.62096	-0.22322	1.208	1.027	0.398	0.394	-0.066
31	1.0973	0.4425	-0.54647	-0.20228	1.176	1.017	0.344	0.394	-0.029
32	1.1151	0.4705	-0.35082	-0.18364	1.089	1.007	0.167	0.235	0.0
33	1.1329	0.4987	-0.11397	-0.16650	0.972	0.999	-0.053	0.0	0.0
34	1.1510	0.5272	-0.02214	-0.14974	0.922	0.990	-0.128	0.0	0.0
35	1.1692	0.5559	-0.03562	-0.13199	0.930	0.981	-0.096	0.0	0.0
36	1.1876	0.5850	-0.04405	-0.11260	0.934	0.971	-0.069	0.0	0.0
37	1.2062	0.6143	-0.04123	-0.09182	0.933	0.960	-0.051	0.0	0.0
38	1.2250	0.6439	-0.02893	-0.06983	0.926	0.948	-0.041	0.0	0.0
39	1.2439	0.6737	-0.01109	-0.04791	0.916	0.936	-0.037	0.0	0.0
40	1.2629	0.7037	0.00902	-0.02631	0.905	0.925	-0.035	0.0	0.0
41	1.2819	0.7336	0.02922	-0.00496	0.894	0.913	-0.034	0.0	0.0
42	1.3008	0.7634	0.04815	0.01501	0.883	0.902	-0.033	0.0	0.0
43	1.3193	0.7927	0.06525	0.03362	0.873	0.891	-0.032	0.0	0.0
44	1.3373	0.8211	0.08114	0.05151	0.863	0.881	-0.030	0.0	0.0
45	1.3545	0.8481	0.09713	0.06907	0.854	0.871	-0.028	0.0	0.0
46	1.3706	0.8735	0.11421	0.08701	0.844	0.860	-0.027	0.0	0.0
47	1.3856	0.8972	0.13297	0.10535	0.832	0.849	-0.028	0.0	0.0
48	1.3996	0.9193	0.15311	0.12316	0.820	0.838	-0.030	0.0	0.0
49	1.4128	0.9401	0.17448	0.13967	0.807	0.828	-0.035	0.0	0.0
50	1.4256	0.9603	0.19716	0.15930	0.792	0.816	-0.038	0.0	0.0
51	1.4382	0.9801	0.22308	0.18906	0.775	0.797	-0.034	0.0	0.0
52	1.4508	1.0000	0.25666	0.23823	0.753	0.765	-0.018	0.0	0.0
53	1.4637	1.0204	0.24211	0.23821	0.763	0.765	-0.004	0.0	0.0
54	1.4793	1.0449	0.18547	0.18477	0.800	0.800	-0.001	0.0	0.0
55	1.5031	1.0826	0.14337	0.14330	0.826	0.826	-0.000	0.0	0.0
56	1.5478	1.1529	0.10754	0.10754	0.848	0.848	-0.000	0.0	0.0
57	1.6222	1.2703	0.07929	0.07927	0.865	0.865	-0.000	0.0	0.0
58	1.7031	1.3979	0.06082	0.05350	0.875	0.880	-0.007	0.0	0.0

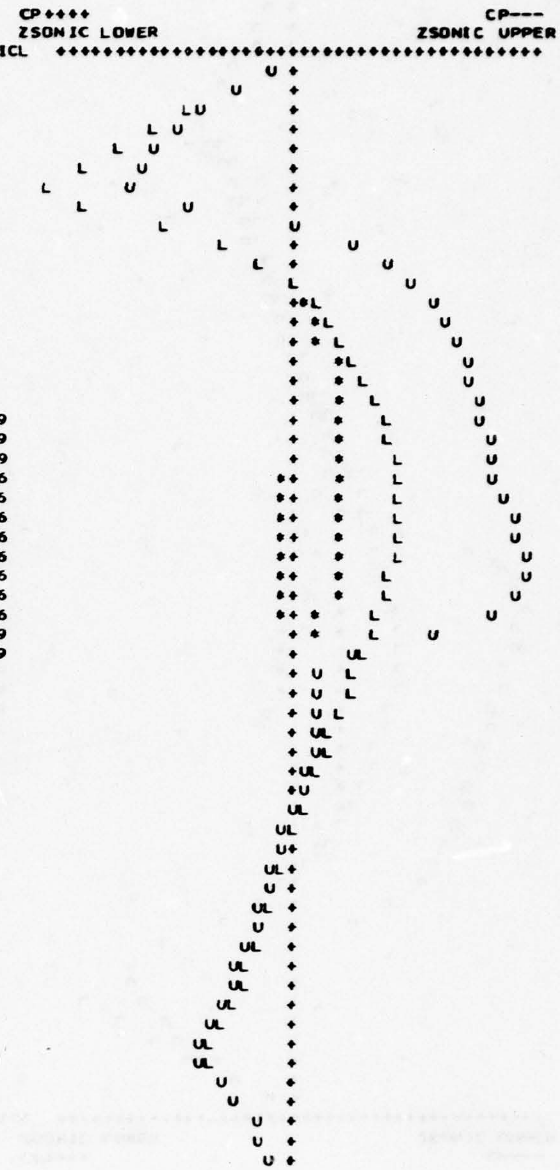


K=20 SPAN STATION ETA= 0.69091 Y= 1.55454

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICJ	ZSONICL
2	0.7554	-0.2013	0.05936	0.05201	0.876	0.880	-0.037	0.0	0.0
3	0.8241	-0.0841	0.15223	0.15813	0.820	0.817	0.006	0.0	0.0
4	0.8471	-0.0532	0.25484	0.26178	0.754	0.736	0.027	0.0	0.0
5	0.8580	-0.0323	0.32920	0.39202	0.702	0.655	0.053	0.0	0.0
6	0.8648	-0.0210	0.38479	0.45115	0.661	0.573	0.106	0.0	0.0
7	0.8702	-0.0121	0.43336	0.55146	0.622	0.476	0.158	0.0	0.0
8	0.8752	-0.0040	0.48158	0.70482	0.581	0.333	0.223	0.0	0.0
9	0.8800	0.0040	0.31188	0.55669	0.715	0.470	0.235	0.0	0.0
10	0.8849	0.0120	0.01551	0.33621	0.901	0.697	0.320	0.0	0.0
11	0.8898	0.0201	-0.15462	0.18225	0.993	0.802	0.337	0.0	0.0
12	0.8948	0.0283	-0.26608	0.07261	1.048	0.868	0.339	0.029	0.0
13	0.9000	0.0369	-0.33838	-0.00989	1.083	0.916	0.328	0.029	0.0
14	0.9056	0.0461	-0.39035	-0.07344	1.107	0.950	0.317	0.066	0.0
15	0.9116	0.0561	-0.42578	-0.12154	1.123	0.976	0.304	0.235	0.0
16	0.9184	0.0672	-0.45117	-0.16120	1.135	0.996	0.290	0.235	0.0
17	0.9261	0.0799	-0.47255	-0.19492	1.144	1.013	0.278	0.394	0.0
18	0.9350	0.0947	-0.49009	-0.22195	1.152	1.027	0.258	0.394	0.0
19	0.9456	0.1121	-0.50621	-0.24471	1.159	1.038	0.251	0.394	0.0
20	0.9580	0.1326	-0.52103	-0.26325	1.165	1.047	0.258	0.394	-0.029
21	0.9725	0.1564	-0.53532	-0.27871	1.172	1.054	0.257	0.631	-0.029
22	0.9887	0.1831	-0.55002	-0.29150	1.178	1.061	0.259	0.631	-0.066
23	1.0062	0.2120	-0.56612	-0.30174	1.185	1.065	0.254	0.631	-0.066
24	1.0244	0.2419	-0.58456	-0.31023	1.193	1.069	0.275	0.631	-0.066
25	1.0426	0.2719	-0.60774	-0.31692	1.203	1.073	0.291	0.631	-0.066
26	1.0605	0.3014	-0.62958	-0.31493	1.212	1.072	0.315	0.394	-0.066
27	1.0780	0.3303	-0.64377	-0.29828	1.218	1.064	0.345	0.394	-0.066
28	1.0952	0.3587	-0.64613	-0.27266	1.219	1.051	0.373	0.394	-0.066
29	1.1123	0.3867	-0.63494	-0.24663	1.214	1.039	0.398	0.394	-0.066
30	1.1292	0.4146	-0.59464	-0.22429	1.197	1.028	0.370	0.394	-0.066
31	1.1461	0.4425	-0.47343	-0.20572	1.144	1.019	0.258	0.235	-0.029
32	1.1631	0.4705	-0.23630	-0.18928	1.034	1.010	0.047	0.131	-0.029
33	1.1802	0.4987	-0.06071	-0.17327	0.943	1.002	-0.113	0.0	0.0
34	1.1975	0.5272	-0.04200	-0.15581	0.933	0.993	-0.114	0.0	0.0
35	1.2149	0.5559	-0.05687	-0.13583	0.941	0.983	-0.079	0.0	0.0
36	1.2326	0.5850	-0.06018	-0.11397	0.943	0.972	-0.054	0.0	0.0
37	1.2504	0.6143	-0.05210	-0.09132	0.939	0.960	-0.039	0.0	0.0
38	1.2683	0.6439	-0.03601	-0.06651	0.930	0.948	-0.032	0.0	0.0
39	1.2864	0.6737	-0.01612	-0.04599	0.919	0.935	-0.030	0.0	0.0
40	1.3046	0.7037	0.00493	-0.02399	0.907	0.923	-0.029	0.0	0.0
41	1.3228	0.7336	0.02570	-0.00288	0.896	0.912	-0.029	0.0	0.0
42	1.3408	0.7634	0.04517	0.01687	0.884	0.901	-0.028	0.0	0.0
43	1.3586	0.7927	0.06271	0.03546	0.874	0.890	-0.027	0.0	0.0
44	1.3758	0.8211	0.07988	0.05333	0.865	0.880	-0.026	0.0	0.0
45	1.3922	0.8481	0.09573	0.07107	0.855	0.869	-0.025	0.0	0.0
46	1.4077	0.8735	0.11342	0.08920	0.844	0.859	-0.024	0.0	0.0
47	1.4220	0.8972	0.13242	0.10752	0.833	0.848	-0.025	0.0	0.0
48	1.4354	0.9193	0.15235	0.12527	0.820	0.837	-0.027	0.0	0.0
49	1.4481	0.9401	0.17309	0.14176	0.807	0.827	-0.031	0.0	0.0
50	1.4603	0.9603	0.19497	0.16152	0.794	0.815	-0.033	0.0	0.0
51	1.4724	0.9801	0.21979	0.19181	0.777	0.796	-0.028	0.0	0.0
52	1.4844	1.0000	0.25513	0.24068	0.754	0.764	-0.014	0.0	0.0
53	1.4968	1.0204	0.24371	0.24062	0.762	0.764	-0.003	0.0	0.0
54	1.5117	1.0449	0.18773	0.18715	0.798	0.799	-0.001	0.0	0.0
55	1.5345	1.0826	0.14549	0.14543	0.825	0.825	-0.000	0.0	0.0
56	1.5772	1.1529	0.10936	0.10936	0.847	0.847	0.000	0.0	0.0
57	1.6484	1.2703	0.08074	0.08070	0.864	0.864	-0.000	0.0	0.0
58	1.7259	1.3979	0.06418	0.05263	0.873	0.880	-0.012	0.0	0.0



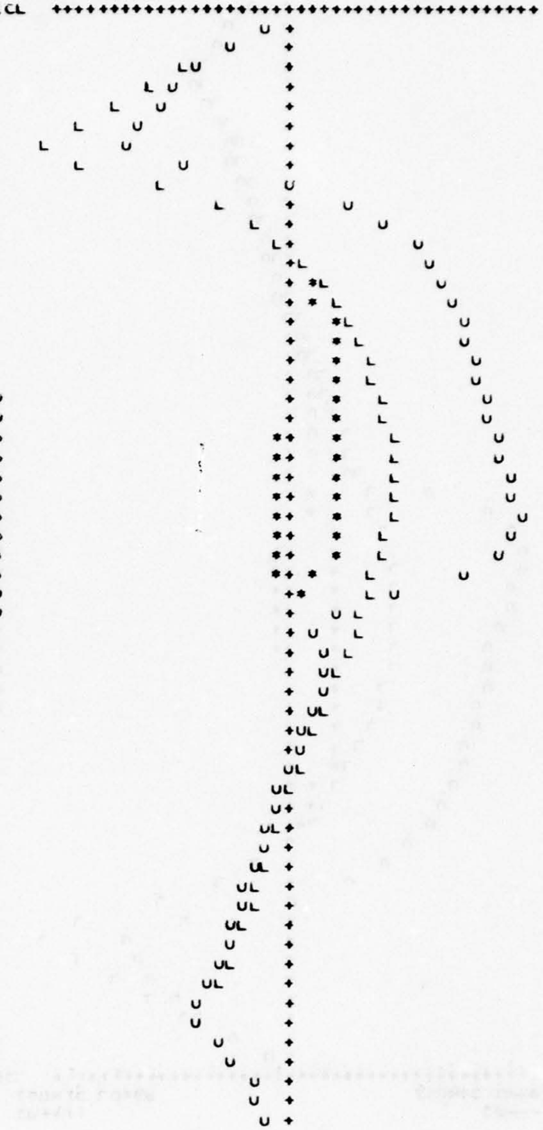
J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICJ	ZSONICL
2	0.8218	-0.2013	0.05822	0.05071	0.877	0.881	-0.008	0.0	0.0
3	0.8874	-0.0801	0.15445	0.16150	0.819	0.815	0.007	0.0	0.0
4	0.9094	-0.0502	0.25582	0.28675	0.754	0.732	0.031	0.0	0.0
5	0.9197	-0.0323	0.32693	0.39651	0.704	0.651	0.070	0.0	0.0
6	0.9263	-0.0210	0.37882	0.49479	0.665	0.570	0.116	0.0	0.0
7	0.9314	-0.0121	0.42336	0.59293	0.630	0.474	0.170	0.0	0.0
8	0.9361	-0.0040	0.46681	0.70299	0.594	0.336	0.236	0.0	0.0
9	0.9408	0.0040	0.29911	0.59879	0.724	0.468	0.300	0.0	0.0
10	0.9454	0.0120	0.00951	0.34687	0.905	0.689	0.337	0.0	0.0
11	0.9501	0.0201	-0.15873	0.19652	0.995	0.792	0.356	0.0	0.0
12	0.9549	0.0283	-0.26939	0.08925	1.050	0.859	0.359	0.029	0.0
13	0.9599	0.0369	-0.34188	0.00749	1.084	0.906	0.349	0.029	0.0
14	0.9652	0.0461	-0.39487	-0.05611	1.109	0.941	0.339	0.066	0.0
15	0.9709	0.0561	-0.43120	-0.10451	1.126	0.967	0.327	0.235	0.0
16	0.9774	0.0672	-0.45719	-0.14465	1.137	0.988	0.312	0.235	0.0
17	0.9848	0.0799	-0.47892	-0.17893	1.147	1.005	0.300	0.394	0.0
18	0.9933	0.0947	-0.49647	-0.20666	1.155	1.019	0.290	0.394	0.0
19	1.0034	0.1121	-0.51222	-0.22555	1.162	1.031	0.282	0.394	0.0
20	1.0153	0.1326	-0.52648	-0.24882	1.168	1.040	0.278	0.394	-0.029
21	1.0291	0.1564	-0.54004	-0.26519	1.174	1.048	0.275	0.394	-0.029
22	1.0446	0.1831	-0.55419	-0.27934	1.180	1.055	0.275	0.394	-0.029
23	1.0613	0.2120	-0.56965	-0.29125	1.186	1.060	0.278	0.394	-0.066
24	1.0787	0.2419	-0.58766	-0.30155	1.194	1.065	0.286	0.394	-0.066
25	1.0960	0.2719	-0.60947	-0.31008	1.203	1.069	0.299	0.394	-0.066
26	1.1131	0.3014	-0.63038	-0.30965	1.212	1.069	0.321	0.394	-0.066
27	1.1299	0.3303	-0.64208	-0.29452	1.217	1.062	0.347	0.394	-0.066
28	1.1463	0.3587	-0.64055	-0.27159	1.216	1.051	0.369	0.394	-0.066
29	1.1626	0.3857	-0.61968	-0.24852	1.208	1.040	0.371	0.394	-0.066
30	1.1787	0.4146	-0.55105	-0.23022	1.178	1.031	0.321	0.235	-0.066
31	1.1949	0.4425	-0.37744	-0.21400	1.101	1.023	0.153	0.235	-0.029
32	1.2111	0.4705	-0.15155	-0.19770	0.991	1.015	-0.046	0.0	-0.029
33	1.2275	0.4987	-0.05481	-0.17929	0.940	1.005	-0.124	0.0	0.0
34	1.2440	0.5272	-0.06967	-0.15816	0.948	0.994	-0.088	0.0	0.0
35	1.2606	0.5559	-0.07779	-0.13544	0.952	0.983	-0.058	0.0	0.0
36	1.2775	0.5850	-0.07382	-0.11213	0.950	0.971	-0.038	0.0	0.0
37	1.2945	0.6143	-0.05956	-0.08855	0.943	0.958	-0.029	0.0	0.0
38	1.3116	0.6439	-0.04061	-0.06607	0.932	0.946	-0.025	0.0	0.0
39	1.3289	0.6737	-0.01946	-0.04369	0.921	0.934	-0.024	0.0	0.0
40	1.3463	0.7037	0.00215	-0.02225	0.909	0.922	-0.024	0.0	0.0
41	1.3636	0.7336	0.02321	-0.00159	0.897	0.911	-0.025	0.0	0.0
42	1.3809	0.7634	0.04270	0.01833	0.886	0.900	-0.024	0.0	0.0
43	1.3979	0.7927	0.06074	0.03720	0.875	0.889	-0.024	0.0	0.0
44	1.4143	0.8211	0.07804	0.05525	0.865	0.879	-0.023	0.0	0.0
45	1.4300	0.8451	0.09525	0.07345	0.855	0.868	-0.022	0.0	0.0
46	1.4447	0.8735	0.11324	0.09161	0.844	0.857	-0.021	0.0	0.0
47	1.4584	0.8972	0.13245	0.11020	0.833	0.846	-0.022	0.0	0.0
48	1.4712	0.9193	0.15241	0.12799	0.820	0.835	-0.024	0.0	0.0
49	1.4833	0.9401	0.17301	0.14459	0.808	0.825	-0.028	0.0	0.0
50	1.4950	0.9603	0.19494	0.16455	0.794	0.813	-0.030	0.0	0.0
51	1.5065	0.9801	0.22033	0.19465	0.777	0.794	-0.026	0.0	0.0
52	1.5180	1.0000	0.25596	0.24330	0.753	0.762	-0.013	0.0	0.0
53	1.5298	1.0204	0.24540	0.24313	0.761	0.762	-0.002	0.0	0.0
54	1.5440	1.0449	0.19051	0.19006	0.796	0.797	-0.000	0.0	0.0
55	1.5658	1.0826	0.14816	0.14811	0.823	0.823	-0.000	0.0	0.0
56	1.6066	1.1529	0.11154	0.11154	0.845	0.845	0.000	0.0	0.0
57	1.6747	1.2703	0.08237	0.08230	0.863	0.863	-0.000	0.0	0.0
58	1.7486	1.3979	0.06777	0.05209	0.871	0.880	-0.016	0.0	0.0



K=22 SPAN STATION ETA= 0.76364 Y= 1.71818

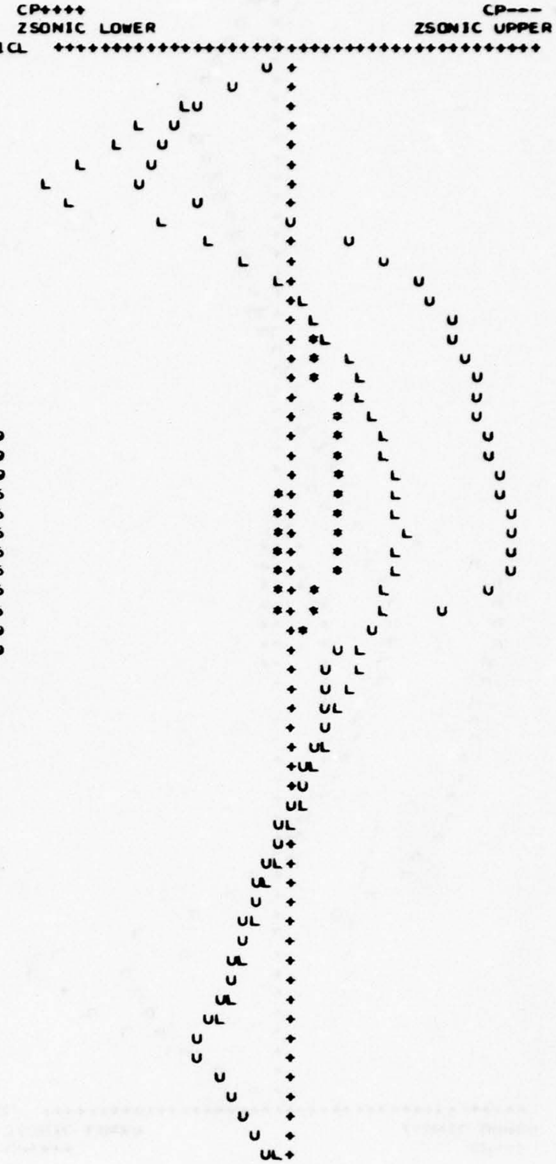
J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.8881	-0.2013	0.06466	0.05430	0.873	0.879	-0.010	0.0	0.0
3	0.9507	-0.0881	0.15835	0.16674	0.817	0.811	0.008	0.0	0.0
4	0.9716	-0.0502	0.25727	0.29274	0.753	0.728	0.035	0.0	0.0
5	0.9815	-0.0323	0.32468	0.40246	0.706	0.647	0.078	0.0	0.0
6	0.9877	-0.0210	0.37272	0.49880	0.670	0.566	0.126	0.0	0.0
7	0.9926	-0.0121	0.41319	0.59451	0.639	0.472	0.181	0.0	0.0
8	0.9971	-0.0040	0.45198	0.70101	0.607	0.339	0.249	0.0	0.0
9	1.0015	0.0040	0.28656	0.60065	0.732	0.466	0.314	0.0	0.0
10	1.0060	0.0120	0.00370	0.35742	0.908	0.682	0.354	0.0	0.0
11	1.0104	0.0201	-0.16192	0.21160	0.996	0.783	0.374	0.0	0.0
12	1.0150	0.0283	-0.27167	0.10600	1.051	0.849	0.378	0.029	0.0
13	1.0197	0.0369	-0.34432	0.02504	1.086	0.896	0.369	0.029	0.0
14	1.0248	0.0461	-0.39826	-0.03658	1.111	0.931	0.360	0.066	0.0
15	1.0303	0.0561	-0.43544	-0.08752	1.127	0.958	0.348	0.235	0.0
16	1.0364	0.0672	-0.46205	-0.12826	1.139	0.979	0.334	0.235	0.0
17	1.0435	0.0799	-0.48440	-0.16340	1.149	0.997	0.321	0.394	0.0
18	1.0516	0.0947	-0.50201	-0.19236	1.157	1.012	0.310	0.394	0.0
19	1.0612	0.1121	-0.51739	-0.21660	1.164	1.024	0.301	0.394	0.0
20	1.0726	0.1326	-0.53120	-0.23644	1.170	1.034	0.295	0.394	0.0
21	1.0857	0.1564	-0.54414	-0.25394	1.175	1.042	0.290	0.394	-0.029
22	1.1005	0.1831	-0.55751	-0.26928	1.181	1.050	0.288	0.394	-0.029
23	1.1164	0.2120	-0.57216	-0.28263	1.188	1.056	0.290	0.394	-0.066
24	1.1329	0.2419	-0.58896	-0.29460	1.195	1.062	0.294	0.394	-0.066
25	1.1495	0.2719	-0.60936	-0.30503	1.203	1.067	0.304	0.394	-0.066
26	1.1658	0.3014	-0.62847	-0.30704	1.211	1.068	0.321	0.394	-0.066
27	1.1817	0.3303	-0.63741	-0.29528	1.215	1.062	0.342	0.394	-0.066
28	1.1974	0.3587	-0.62945	-0.27598	1.212	1.053	0.353	0.394	-0.066
29	1.2129	0.3867	-0.59207	-0.25683	1.196	1.044	0.335	0.394	-0.066
30	1.2283	0.4146	-0.48767	-0.23954	1.151	1.035	0.248	0.235	-0.066
31	1.2437	0.4425	-0.28664	-0.22197	1.058	1.027	0.065	0.131	-0.029
32	1.2592	0.4705	-0.11644	-0.20236	0.973	1.017	-0.086	0.0	-0.029
33	1.2748	0.4987	-0.08022	-0.18011	0.954	1.006	-0.100	0.0	0.0
34	1.2905	0.5272	-0.09268	-0.15662	0.960	0.994	-0.064	0.0	0.0
35	1.3064	0.5559	-0.09280	-0.13332	0.960	0.982	-0.041	0.0	0.0
36	1.3224	0.5850	-0.08228	-0.11008	0.955	0.970	-0.028	0.0	0.0
37	1.3386	0.6143	-0.06434	-0.08713	0.945	0.957	-0.023	0.0	0.0
38	1.3549	0.6439	-0.04266	-0.06457	0.934	0.945	-0.022	0.0	0.0
39	1.3714	0.6737	-0.02074	-0.04251	0.922	0.933	-0.022	0.0	0.0
40	1.3879	0.7037	0.00106	-0.02092	0.909	0.922	-0.022	0.0	0.0
41	1.4045	0.7336	0.02226	0.00029	0.897	0.910	-0.022	0.0	0.0
42	1.4209	0.7634	0.04217	0.02064	0.886	0.898	-0.022	0.0	0.0
43	1.4371	0.7927	0.06062	0.03992	0.875	0.887	-0.021	0.0	0.0
44	1.4528	0.8211	0.07838	0.05850	0.865	0.877	-0.020	0.0	0.0
45	1.4677	0.8481	0.09637	0.07706	0.854	0.866	-0.019	0.0	0.0
46	1.4818	0.8735	0.11492	0.09565	0.843	0.855	-0.019	0.0	0.0
47	1.4948	0.8972	0.13433	0.11408	0.832	0.844	-0.020	0.0	0.0
48	1.5070	0.9193	0.15426	0.13193	0.819	0.833	-0.022	0.0	0.0
49	1.5185	0.9401	0.17463	0.14867	0.806	0.823	-0.026	0.0	0.0
50	1.5297	0.9603	0.19634	0.16862	0.793	0.810	-0.028	0.0	0.0
51	1.5406	0.9801	0.22162	0.19897	0.776	0.791	-0.023	0.0	0.0
52	1.5516	1.0000	0.25752	0.24703	0.752	0.759	-0.010	0.0	0.0
53	1.5629	1.0204	0.24813	0.24664	0.759	0.760	-0.001	0.0	0.0
54	1.5764	1.0449	0.19404	0.19375	0.794	0.794	-0.000	0.0	0.0
55	1.5972	1.0826	0.15130	0.15129	0.821	0.821	-0.000	0.0	0.0
56	1.6360	1.1529	0.11388	0.11388	0.844	0.844	0.000	0.0	0.0
57	1.7009	1.2703	0.08380	0.08371	0.862	0.862	-0.000	0.0	0.0
58	1.7714	1.3979	0.06970	0.05124	0.870	0.881	-0.018	0.0	0.0

CP++++ CP---
ZSONIC LOWER ZSONIC UPPER



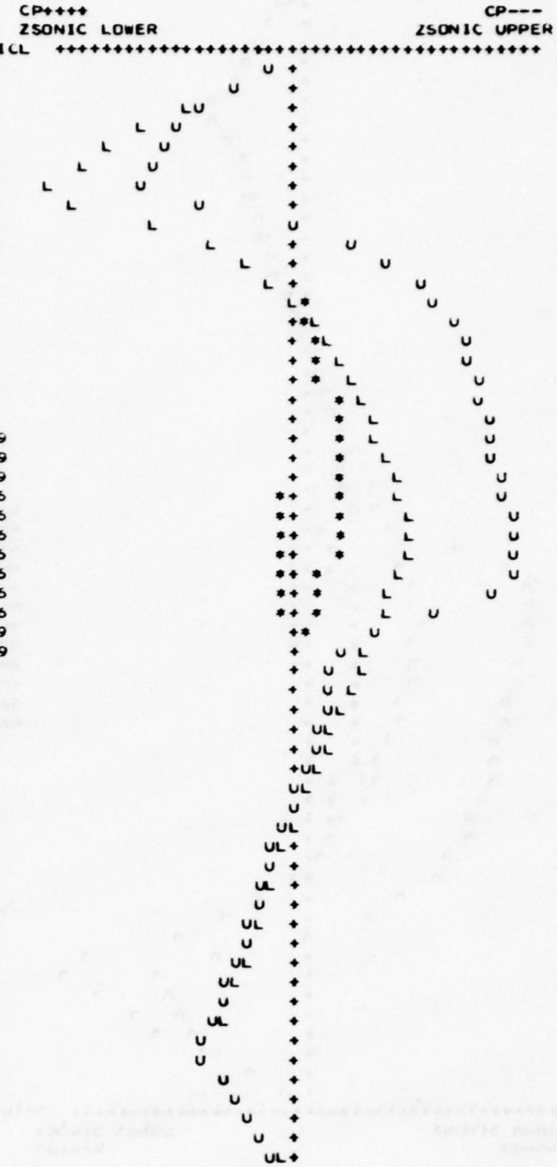
K=23 SPAN STATIUN ETA= 0.80000 Y= 1.00000

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	0.9545	-0.2013	0.06791	0.05525	0.871	0.879	-0.013	0.0	0.0
3	1.0139	-0.0881	0.16110	0.17110	0.815	0.809	0.010	0.0	0.0
4	1.0339	-0.0502	0.25772	0.29814	0.752	0.724	0.040	0.0	0.0
5	1.0432	-0.0323	0.32142	0.40729	0.708	0.643	0.086	0.0	0.0
6	1.0492	-0.0210	0.36571	0.50188	0.675	0.563	0.136	0.0	0.0
7	1.0538	-0.0121	0.40229	0.59494	0.647	0.472	0.193	0.0	0.0
8	1.0581	-0.0040	0.43671	0.69763	0.619	0.344	0.261	0.0	0.0
9	1.0623	0.0040	0.27393	0.60106	0.741	0.465	0.327	0.0	0.0
10	1.0665	0.0120	-0.00191	0.36664	0.911	0.675	0.369	0.0	0.0
11	1.0707	0.0201	-0.16472	0.22514	0.998	0.774	0.390	0.0	0.0
12	1.0751	0.0283	-0.27341	0.12182	1.052	0.839	0.395	0.029	0.0
13	1.0796	0.0369	-0.34615	0.04184	1.086	0.886	0.388	0.029	0.0
14	1.0844	0.0461	-0.40101	-0.02167	1.112	0.922	0.379	0.066	0.0
15	1.0896	0.0561	-0.43928	-0.07117	1.129	0.949	0.368	0.235	0.0
16	1.0955	0.0672	-0.46676	-0.11277	1.141	0.971	0.354	0.235	0.0
17	1.1021	0.0799	-0.48954	-0.14881	1.152	0.990	0.341	0.235	0.0
18	1.1099	0.0947	-0.50714	-0.17877	1.159	1.005	0.328	0.235	0.0
19	1.1191	0.1121	-0.52194	-0.20462	1.166	1.018	0.317	0.394	0.0
20	1.1298	0.1326	-0.53484	-0.22607	1.171	1.029	0.309	0.394	0.0
21	1.1423	0.1564	-0.54686	-0.24474	1.177	1.038	0.302	0.394	-0.029
22	1.1563	0.1831	-0.55925	-0.26186	1.182	1.046	0.297	0.394	-0.029
23	1.1715	0.2120	-0.57264	-0.27743	1.188	1.054	0.295	0.394	-0.029
24	1.1872	0.2419	-0.58786	-0.29161	1.194	1.061	0.296	0.394	-0.066
25	1.2029	0.2719	-0.60643	-0.30476	1.202	1.067	0.302	0.394	-0.066
26	1.2184	0.3014	-0.62335	-0.31021	1.209	1.069	0.313	0.394	-0.066
27	1.2336	0.3303	-0.62820	-0.30185	1.211	1.065	0.326	0.394	-0.066
28	1.2485	0.3587	-0.61175	-0.28463	1.204	1.057	0.327	0.394	-0.066
29	1.2632	0.3867	-0.55632	-0.26538	1.181	1.048	0.291	0.235	-0.066
30	1.2779	0.4146	-0.42722	-0.24581	1.124	1.038	0.181	0.235	-0.066
31	1.2925	0.4425	-0.23662	-0.22492	1.034	1.028	0.012	0.131	-0.029
32	1.3072	0.4705	-0.11700	-0.20247	0.973	1.017	-0.085	0.0	-0.029
33	1.3220	0.4987	-0.10367	-0.17884	0.966	1.005	-0.075	0.0	0.0
34	1.3370	0.5272	-0.10620	-0.15554	0.968	0.993	-0.049	0.0	0.0
35	1.3521	0.5559	-0.09848	-0.13250	0.963	0.981	-0.034	0.0	0.0
36	1.3673	0.5850	-0.08321	-0.10901	0.955	0.969	-0.026	0.0	0.0
37	1.3827	0.6143	-0.06333	-0.08572	0.945	0.957	-0.022	0.0	0.0
38	1.3983	0.6439	-0.04115	-0.06265	0.933	0.944	-0.021	0.0	0.0
39	1.4139	0.6737	-0.01882	-0.04008	0.920	0.932	-0.021	0.0	0.0
40	1.4296	0.7037	0.00300	-0.01764	0.908	0.920	-0.021	0.0	0.0
41	1.4454	0.7336	0.02432	0.00419	0.896	0.908	-0.020	0.0	0.0
42	1.4610	0.7634	0.04434	0.02476	0.885	0.896	-0.020	0.0	0.0
43	1.4764	0.7927	0.06320	0.04457	0.874	0.885	-0.019	0.0	0.0
44	1.4913	0.8211	0.08167	0.06367	0.863	0.874	-0.018	0.0	0.0
45	1.5055	0.8481	0.10021	0.08230	0.852	0.863	-0.018	0.0	0.0
46	1.5188	0.8735	0.11881	0.10062	0.841	0.852	-0.018	0.0	0.0
47	1.5312	0.8972	0.13792	0.11888	0.829	0.841	-0.019	0.0	0.0
48	1.5428	0.9193	0.15746	0.13667	0.817	0.830	-0.021	0.0	0.0
49	1.5538	0.9401	0.17732	0.15348	0.805	0.820	-0.024	0.0	0.0
50	1.5643	0.9603	0.19859	0.17378	0.791	0.807	-0.025	0.0	0.0
51	1.5748	0.9801	0.22364	0.20393	0.775	0.788	-0.020	0.0	0.0
52	1.5852	1.0000	0.25978	0.25138	0.751	0.757	-0.008	0.0	0.0
53	1.5959	1.0204	0.25147	0.25073	0.756	0.757	-0.001	0.0	0.0
54	1.6088	1.0449	0.19802	0.19790	0.792	0.792	-0.000	0.0	0.0
55	1.6285	1.0826	0.15464	0.15466	0.819	0.819	0.000	0.0	0.0
56	1.6655	1.1529	0.11600	0.11602	0.843	0.843	0.000	0.0	0.0
57	1.7271	1.2703	0.08446	0.08432	0.861	0.862	-0.000	0.0	0.0
58	1.7941	1.3979	0.07313	0.04508	0.868	0.884	-0.028	0.0	0.0



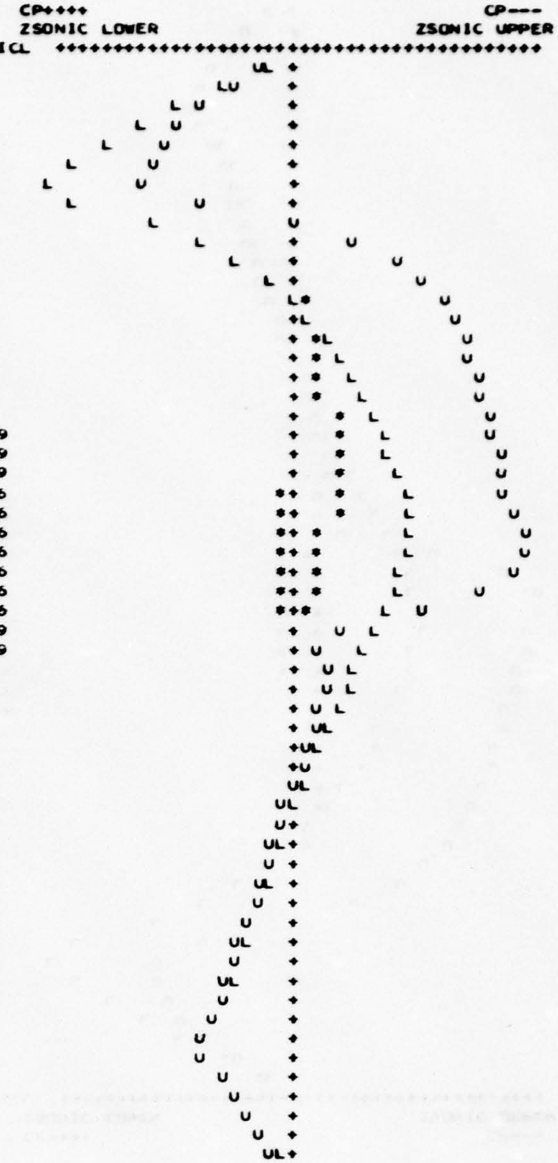
K=24 SPAN STATION ETA= 0.83636 Y= 1.88182

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	1.0209	-0.2013	0.07382	0.05829	0.868	0.877	-0.016	0.0	0.0
3	1.0772	-0.0881	0.16458	0.17642	0.813	0.805	0.012	0.0	0.0
4	1.0961	-0.0502	0.25813	0.30402	0.752	0.720	0.046	0.0	0.0
5	1.1050	-0.0323	0.31780	0.41222	0.710	0.639	0.094	0.0	0.0
6	1.1106	-0.0210	0.35826	0.50474	0.681	0.561	0.146	0.0	0.0
7	1.1150	-0.0121	0.39104	0.59486	0.656	0.472	0.204	0.0	0.0
8	1.1191	-0.0040	0.42128	0.69348	0.632	0.350	0.272	0.0	0.0
9	1.1231	0.0040	0.26155	0.60066	0.750	0.466	0.339	0.0	0.0
10	1.1270	0.0120	-0.00677	0.37525	0.914	0.668	0.382	0.0	0.0
11	1.1311	0.0201	-0.16636	0.23820	0.999	0.765	0.405	0.0	0.0
12	1.1352	0.0283	-0.27384	0.13722	1.052	0.830	0.411	0.029	0.0
13	1.1395	0.0369	-0.34668	0.05820	1.087	0.877	0.405	0.029	0.0
14	1.1440	0.0461	-0.40235	-0.00537	1.112	0.913	0.397	0.066	0.0
15	1.1490	0.0561	-0.44153	-0.05571	1.130	0.941	0.386	0.131	0.0
16	1.1545	0.0672	-0.46956	-0.09858	1.143	0.964	0.371	0.235	0.0
17	1.1608	0.0799	-0.49243	-0.13627	1.153	0.983	0.356	0.235	0.0
18	1.1682	0.0947	-0.50994	-0.16826	1.161	1.000	0.342	0.235	0.0
19	1.1769	0.1121	-0.52442	-0.19629	1.167	1.014	0.328	0.394	0.0
20	1.1871	0.1326	-0.53648	-0.21966	1.172	1.025	0.317	0.394	0.0
21	1.1989	0.1564	-0.54733	-0.24057	1.177	1.036	0.307	0.394	-0.029
22	1.2122	0.1831	-0.55851	-0.26028	1.182	1.045	0.298	0.394	-0.029
23	1.2266	0.2120	-0.57086	-0.27824	1.187	1.054	0.293	0.394	-0.029
24	1.2415	0.2419	-0.58529	-0.29502	1.193	1.062	0.290	0.394	-0.066
25	1.2564	0.2719	-0.60289	-0.31066	1.201	1.070	0.292	0.394	-0.066
26	1.2711	0.3014	-0.61820	-0.31782	1.207	1.073	0.300	0.394	-0.066
27	1.2855	0.3303	-0.62037	-0.30999	1.208	1.069	0.310	0.394	-0.066
28	1.2996	0.3587	-0.59903	-0.29196	1.199	1.061	0.307	0.235	-0.066
29	1.3136	0.3867	-0.53477	-0.27087	1.171	1.051	0.264	0.235	-0.066
30	1.3274	0.4146	-0.39598	-0.24944	1.109	1.040	0.147	0.235	-0.066
31	1.3413	0.4425	-0.21308	-0.22722	1.022	1.029	-0.014	0.066	-0.029
32	1.3553	0.4705	-0.11302	-0.20390	0.971	1.018	-0.091	0.0	-0.029
33	1.3693	0.4987	-0.10456	-0.17941	0.967	1.005	-0.075	0.0	0.0
34	1.3835	0.5272	-0.10220	-0.15457	0.965	0.993	-0.052	0.0	0.0
35	1.3978	0.5559	-0.09187	-0.12985	0.960	0.980	-0.038	0.0	0.0
36	1.4122	0.5850	-0.07596	-0.10521	0.952	0.967	-0.029	0.0	0.0
37	1.4268	0.6143	-0.05628	-0.08105	0.941	0.954	-0.025	0.0	0.0
38	1.4416	0.6439	-0.03429	-0.05725	0.929	0.941	-0.023	0.0	0.0
39	1.4564	0.6737	-0.01230	-0.03396	0.917	0.929	-0.022	0.0	0.0
40	1.4713	0.7037	0.00900	-0.01110	0.905	0.916	-0.020	0.0	0.0
41	1.4862	0.7336	0.02999	0.01081	0.893	0.904	-0.019	0.0	0.0
42	1.5010	0.7634	0.04998	0.03155	0.882	0.892	-0.018	0.0	0.0
43	1.5156	0.7927	0.06897	0.05143	0.871	0.881	-0.018	0.0	0.0
44	1.5297	0.8211	0.08738	0.07037	0.860	0.870	-0.017	0.0	0.0
45	1.5432	0.8481	0.10569	0.08868	0.849	0.859	-0.017	0.0	0.0
46	1.5559	0.8735	0.12379	0.10628	0.838	0.849	-0.018	0.0	0.0
47	1.5676	0.8972	0.14222	0.12394	0.827	0.838	-0.018	0.0	0.0
48	1.5786	0.9193	0.16127	0.14155	0.815	0.827	-0.020	0.0	0.0
49	1.5890	0.9401	0.18075	0.15841	0.803	0.817	-0.022	0.0	0.0
50	1.5990	0.9603	0.20194	0.17887	0.789	0.804	-0.023	0.0	0.0
51	1.6089	0.9801	0.22740	0.20897	0.772	0.785	-0.018	0.0	0.0
52	1.6188	1.0000	0.26318	0.25563	0.749	0.754	-0.008	0.0	0.0
53	1.6290	1.0204	0.25488	0.25467	0.754	0.754	-0.000	0.0	0.0
54	1.6412	1.0449	0.20189	0.20190	0.789	0.789	0.000	0.0	0.0
55	1.6599	1.0826	0.15761	0.15766	0.817	0.817	0.000	0.0	0.0
56	1.6949	1.1529	0.11730	0.11733	0.842	0.842	0.000	0.0	0.0
57	1.7534	1.2703	0.08385	0.08361	0.862	0.862	-0.000	0.0	0.0
58	1.8168	1.3979	0.07292	0.04002	0.868	0.887	-0.033	0.0	0.0



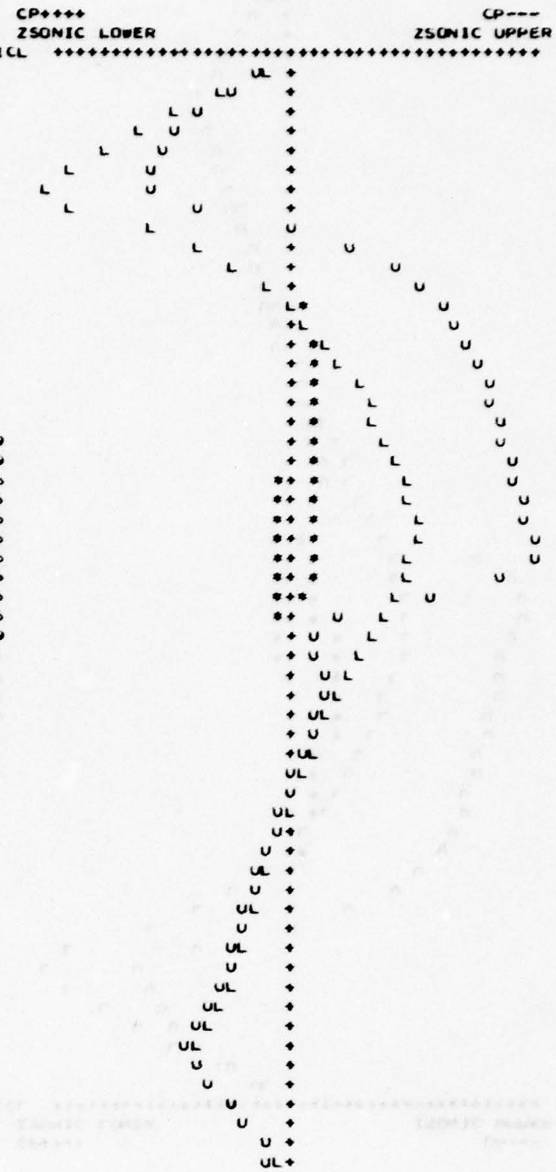
K=25 SPAN STATION ETA= 0.87273 Y= 1.96364

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	1.0872	-0.2013	0.08034	0.06136	0.864	0.875	-0.019	0.0	0.0
3	1.1405	-0.0881	0.16744	0.18148	0.811	0.802	0.014	0.0	0.0
4	1.1583	-0.0502	0.25757	0.30947	0.752	0.716	0.052	0.0	0.0
5	1.1667	-0.0323	0.31311	0.41635	0.714	0.636	0.103	0.0	0.0
6	1.1721	-0.0210	0.34988	0.50639	0.687	0.559	0.157	0.0	0.0
7	1.1762	-0.0121	0.37912	0.59312	0.665	0.474	0.214	0.0	0.0
8	1.1801	-0.0040	0.40562	0.68715	0.645	0.359	0.282	0.0	0.0
9	1.1838	0.0040	0.24954	0.59762	0.758	0.469	0.348	0.0	0.0
10	1.1876	0.0120	-0.01063	0.38082	0.916	0.664	0.391	0.0	0.0
11	1.1914	0.0201	-0.16644	0.24781	0.999	0.759	0.414	0.0	0.0
12	1.1953	0.0283	-0.27242	0.14871	1.051	0.823	0.421	0.029	0.0
13	1.1993	0.0369	-0.34520	0.07012	1.086	0.870	0.415	0.029	0.0
14	1.2036	0.0461	-0.40142	0.00593	1.112	0.907	0.407	0.066	0.0
15	1.2083	0.0561	-0.44141	-0.04585	1.130	0.935	0.396	0.131	0.0
16	1.2136	0.0672	-0.47044	-0.09063	1.143	0.959	0.380	0.235	0.0
17	1.2195	0.0799	-0.49395	-0.13060	1.154	0.980	0.363	0.235	0.0
18	1.2265	0.0947	-0.51149	-0.16491	1.161	0.998	0.347	0.235	0.0
19	1.2347	0.1121	-0.52569	-0.19558	1.167	1.013	0.330	0.235	0.0
20	1.2443	0.1326	-0.53744	-0.22185	1.173	1.027	0.316	0.394	0.0
21	1.2555	0.1564	-0.54840	-0.24491	1.177	1.038	0.303	0.394	-0.029
22	1.2681	0.1831	-0.56032	-0.26642	1.182	1.048	0.294	0.394	-0.029
23	1.2817	0.2120	-0.57384	-0.28635	1.188	1.058	0.287	0.394	-0.029
24	1.2958	0.2419	-0.58961	-0.30466	1.195	1.067	0.285	0.394	-0.066
25	1.3099	0.2719	-0.60903	-0.32073	1.203	1.074	0.288	0.394	-0.066
26	1.3237	0.3014	-0.62694	-0.32754	1.211	1.078	0.299	0.235	-0.066
27	1.3373	0.3303	-0.63258	-0.31885	1.213	1.074	0.314	0.235	-0.066
28	1.3507	0.3587	-0.61123	-0.29957	1.204	1.064	0.312	0.235	-0.066
29	1.3639	0.3867	-0.52616	-0.27700	1.168	1.054	0.249	0.235	-0.066
30	1.3770	0.4146	-0.33703	-0.25375	1.082	1.042	0.083	0.131	-0.066
31	1.3901	0.4425	-0.14218	-0.22905	0.986	1.030	-0.087	0.0	-0.029
32	1.4033	0.4705	-0.07837	-0.20223	0.953	1.017	-0.124	0.0	-0.029
33	1.4166	0.4987	-0.08769	-0.17391	0.958	1.003	-0.086	0.0	0.0
34	1.4300	0.5272	-0.08773	-0.14639	0.958	0.988	-0.059	0.0	0.0
35	1.4435	0.5559	-0.07895	-0.12043	0.953	0.975	-0.041	0.0	0.0
36	1.4572	0.5850	-0.06367	-0.09519	0.945	0.962	-0.032	0.0	0.0
37	1.4710	0.6143	-0.04469	-0.07071	0.935	0.949	-0.026	0.0	0.0
38	1.4849	0.6439	-0.02358	-0.04679	0.923	0.936	-0.023	0.0	0.0
39	1.4989	0.6737	-0.00244	-0.02368	0.911	0.923	-0.021	0.0	0.0
40	1.5130	0.7037	0.01812	-0.00149	0.900	0.911	-0.020	0.0	0.0
41	1.5271	0.7336	0.03831	0.02006	0.888	0.899	-0.018	0.0	0.0
42	1.5411	0.7634	0.05765	0.04059	0.877	0.887	-0.017	0.0	0.0
43	1.5549	0.7927	0.07616	0.05974	0.866	0.876	-0.016	0.0	0.0
44	1.5682	0.8211	0.09406	0.07794	0.856	0.865	-0.016	0.0	0.0
45	1.5809	0.8481	0.11175	0.09550	0.845	0.855	-0.016	0.0	0.0
46	1.5929	0.8735	0.12881	0.11211	0.835	0.845	-0.017	0.0	0.0
47	1.6040	0.8972	0.14651	0.12888	0.824	0.835	-0.018	0.0	0.0
48	1.6144	0.9193	0.16553	0.14607	0.812	0.824	-0.019	0.0	0.0
49	1.6242	0.9401	0.18523	0.16282	0.800	0.814	-0.022	0.0	0.0
50	1.6337	0.9603	0.20719	0.18321	0.786	0.801	-0.024	0.0	0.0
51	1.6431	0.9801	0.23438	0.21286	0.768	0.782	-0.022	0.0	0.0
52	1.6524	1.0000	0.26779	0.25814	0.745	0.752	-0.010	0.0	0.0
53	1.6620	1.0204	0.25678	0.25682	0.753	0.753	0.000	0.0	0.0
54	1.6735	1.0449	0.20444	0.20452	0.787	0.787	0.000	0.0	0.0
55	1.6912	1.0826	0.15914	0.15923	0.816	0.816	0.000	0.0	0.0
56	1.7243	1.1529	0.11682	0.11686	0.842	0.842	0.000	0.0	0.0
57	1.7796	1.2703	0.08133	0.08103	0.863	0.864	-0.000	0.0	0.0
58	1.8396	1.3979	0.07156	0.03396	0.869	0.891	-0.038	0.0	0.0



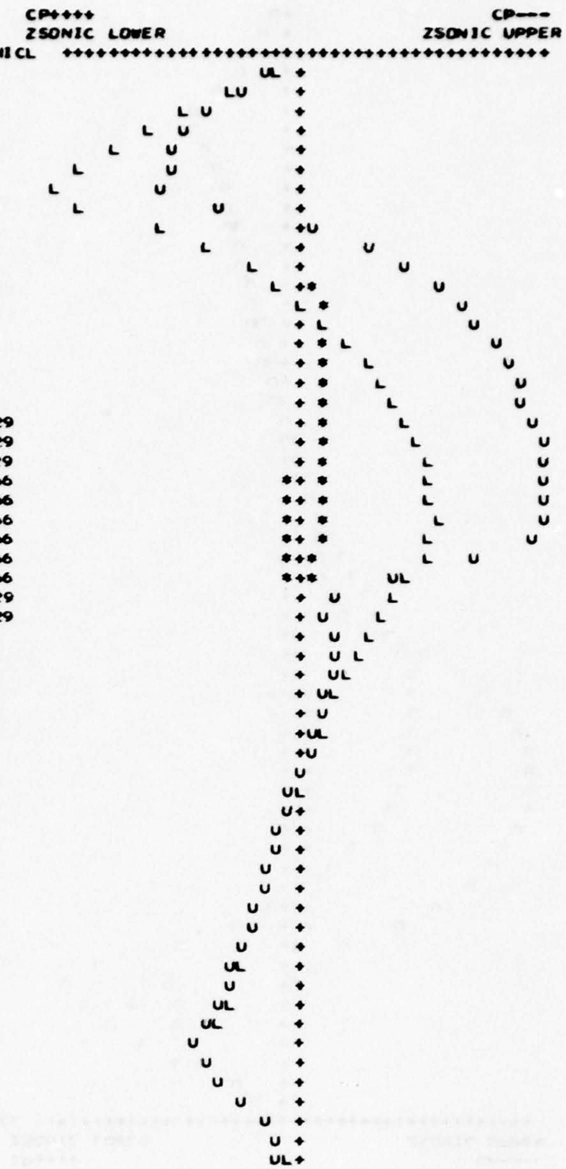
K=26 SPAN STATION ETA= 0.90909 Y= 2.04545

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	1.1536	-0.2013	0.08432	0.06340	0.862	0.874	-0.021	0.0	0.0
3	1.2038	-0.0881	0.16835	0.18472	0.810	0.800	0.016	0.0	0.0
4	1.2206	-0.0502	0.25458	0.31230	0.754	0.714	0.058	0.0	0.0
5	1.2285	-0.0323	0.30591	0.41670	0.719	0.636	0.111	0.0	0.0
6	1.2335	-0.0210	0.33913	0.50311	0.695	0.562	0.164	0.0	0.0
7	1.2374	-0.0121	0.36520	0.58537	0.676	0.482	0.220	0.0	0.0
8	1.2410	-0.0040	0.38863	0.67381	0.658	0.378	0.285	0.0	0.0
9	1.2446	0.0040	0.23692	0.58648	0.766	0.481	0.350	0.0	0.0
10	1.2481	0.0120	-0.01471	0.37727	0.918	0.667	0.392	0.0	0.0
11	1.2517	0.0201	-0.16653	0.24758	0.999	0.759	0.414	0.0	0.0
12	1.2554	0.0283	-0.27089	0.14983	1.051	0.822	0.421	0.029	0.0
13	1.2592	0.0369	-0.34364	0.07133	1.085	0.869	0.415	0.029	0.0
14	1.2632	0.0461	-0.40078	0.00632	1.112	0.906	0.407	0.066	0.0
15	1.2677	0.0561	-0.44227	-0.04691	1.131	0.936	0.395	0.131	0.0
16	1.2726	0.0672	-0.47283	-0.09361	1.144	0.961	0.379	0.235	0.0
17	1.2782	0.0799	-0.49832	-0.13592	1.155	0.983	0.362	0.235	0.0
18	1.2848	0.0947	-0.51835	-0.17312	1.164	1.002	0.345	0.235	0.0
19	1.2925	0.1121	-0.53506	-0.20642	1.172	1.019	0.329	0.235	0.0
20	1.3016	0.1326	-0.54993	-0.23494	1.178	1.033	0.315	0.235	0.0
21	1.3121	0.1564	-0.56479	-0.26036	1.184	1.045	0.304	0.235	-0.029
22	1.3240	0.1831	-0.58094	-0.28367	1.191	1.057	0.297	0.235	-0.029
23	1.3368	0.2120	-0.59866	-0.30433	1.199	1.067	0.294	0.235	-0.066
24	1.3500	0.2419	-0.61876	-0.32211	1.207	1.075	0.297	0.235	-0.066
25	1.3633	0.2719	-0.64176	-0.33653	1.217	1.082	0.305	0.235	-0.066
26	1.3764	0.3014	-0.66010	-0.34069	1.225	1.084	0.319	0.235	-0.066
27	1.3892	0.3303	-0.65197	-0.32883	1.221	1.078	0.323	0.235	-0.066
28	1.4018	0.3587	-0.57411	-0.30558	1.188	1.067	0.269	0.235	-0.066
29	1.4142	0.3867	-0.37213	-0.27742	1.099	1.054	0.095	0.131	-0.066
30	1.4266	0.4146	-0.13950	-0.24738	0.985	1.039	-0.108	0.0	-0.066
31	1.4389	0.4425	-0.05426	-0.21572	0.940	1.024	-0.161	0.0	-0.029
32	1.4513	0.4705	-0.07176	-0.18355	0.949	1.007	-0.112	0.0	0.0
33	1.4638	0.4987	-0.08152	-0.15373	0.954	0.992	-0.072	0.0	0.0
34	1.4765	0.5272	-0.07875	-0.12684	0.953	0.978	-0.048	0.0	0.0
35	1.4892	0.5559	-0.06748	-0.10164	0.947	0.965	-0.034	0.0	0.0
36	1.5021	0.5850	-0.05085	-0.07749	0.938	0.952	-0.027	0.0	0.0
37	1.5151	0.6143	-0.03151	-0.05417	0.927	0.940	-0.023	0.0	0.0
38	1.5282	0.6439	-0.01122	-0.03150	0.916	0.927	-0.020	0.0	0.0
39	1.5414	0.6737	0.00874	-0.00967	0.905	0.915	-0.018	0.0	0.0
40	1.5547	0.7037	0.02801	0.01130	0.894	0.904	-0.017	0.0	0.0
41	1.5680	0.7336	0.04700	0.03177	0.883	0.892	-0.015	0.0	0.0
42	1.5812	0.7634	0.06534	0.05103	0.873	0.881	-0.014	0.0	0.0
43	1.5941	0.7927	0.08280	0.06891	0.862	0.871	-0.014	0.0	0.0
44	1.6067	0.8211	0.09986	0.08601	0.852	0.861	-0.014	0.0	0.0
45	1.6187	0.8481	0.11651	0.10240	0.842	0.851	-0.014	0.0	0.0
46	1.6300	0.8735	0.13229	0.11762	0.833	0.842	-0.015	0.0	0.0
47	1.6404	0.8972	0.14923	0.13326	0.822	0.832	-0.016	0.0	0.0
48	1.6502	0.9193	0.16785	0.14984	0.811	0.822	-0.018	0.0	0.0
49	1.6595	0.9401	0.18729	0.16638	0.798	0.812	-0.021	0.0	0.0
50	1.6684	0.9603	0.20925	0.18664	0.784	0.799	-0.023	0.0	0.0
51	1.6772	0.9801	0.23680	0.21584	0.766	0.780	-0.021	0.0	0.0
52	1.6860	1.0000	0.26966	0.25993	0.744	0.751	-0.010	0.0	0.0
53	1.6950	1.0204	0.25804	0.25804	0.752	0.752	-0.000	0.0	0.0
54	1.7059	1.0449	0.20523	0.20536	0.787	0.787	0.000	0.0	0.0
55	1.7226	1.0826	0.15795	0.15809	0.817	0.817	0.000	0.0	0.0
56	1.7538	1.1529	0.11301	0.11307	0.844	0.844	0.000	0.0	0.0
57	1.8058	1.2703	0.07591	0.07547	0.867	0.867	-0.000	0.0	0.0
58	1.8623	1.3979	0.06981	0.02546	0.870	0.896	-0.044	0.0	0.0



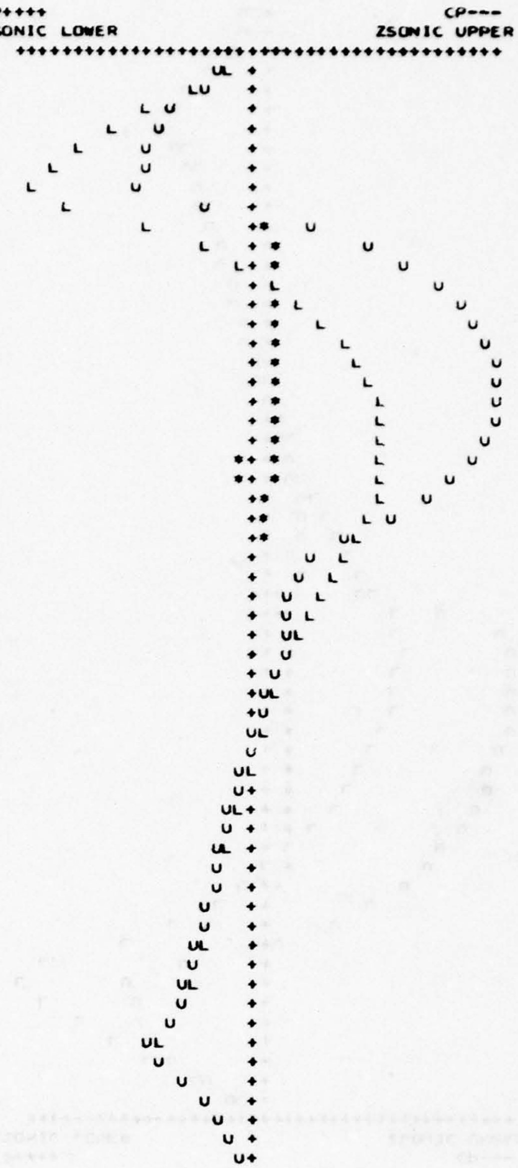
K=27 SPAN STATION ETA= 0.94545 Y= 2.12727

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	1.2199	-0.2013	0.08760	0.06082	0.860	0.875	-0.027	0.0	0.0
3	1.2670	-0.0881	0.16235	0.18062	0.814	0.803	0.018	0.0	0.0
4	1.2828	-0.0502	0.24307	0.30511	0.762	0.719	0.062	0.0	0.0
5	1.2902	-0.0323	0.29001	0.40525	0.730	0.645	0.115	0.0	0.0
6	1.2949	-0.0210	0.32008	0.48694	0.709	0.577	0.167	0.0	0.0
7	1.2986	-0.0121	0.34364	0.56402	0.692	0.504	0.220	0.0	0.0
8	1.3020	-0.0040	0.36492	0.64633	0.676	0.413	0.281	0.0	0.0
9	1.3054	0.0040	0.21752	0.56020	0.779	0.508	0.343	0.0	0.0
10	1.3087	0.0120	-0.02734	0.35733	0.925	0.682	0.385	0.0	0.0
11	1.3120	0.0201	-0.17811	0.22994	1.005	0.771	0.408	0.0	0.0
12	1.3155	0.0283	-0.28259	0.13255	1.056	0.833	0.415	0.029	0.0
13	1.3191	0.0369	-0.35700	0.05304	1.091	0.880	0.410	0.066	0.0
14	1.3229	0.0461	-0.41856	-0.01406	1.120	0.918	0.405	0.235	0.0
15	1.3270	0.0561	-0.46568	-0.07010	1.141	0.948	0.396	0.235	0.0
16	1.3316	0.0672	-0.50267	-0.12022	1.157	0.975	0.382	0.235	0.0
17	1.3369	0.0799	-0.53486	-0.16657	1.171	0.999	0.368	0.235	0.0
18	1.3431	0.0947	-0.56134	-0.20739	1.183	1.019	0.354	0.235	0.0
19	1.3503	0.1121	-0.58355	-0.24253	1.192	1.037	0.341	0.235	0.0
20	1.3588	0.1326	-0.60226	-0.27192	1.200	1.051	0.330	0.235	-0.029
21	1.3687	0.1564	-0.61843	-0.29705	1.207	1.063	0.321	0.235	-0.029
22	1.3799	0.1831	-0.63184	-0.31730	1.213	1.073	0.315	0.235	-0.029
23	1.3919	0.2120	-0.64122	-0.33216	1.217	1.080	0.309	0.235	-0.066
24	1.4043	0.2419	-0.64433	-0.34196	1.218	1.084	0.302	0.235	-0.066
25	1.4168	0.2719	-0.63430	-0.34653	1.214	1.087	0.288	0.235	-0.066
26	1.4290	0.3014	-0.58705	-0.33995	1.194	1.083	0.247	0.235	-0.066
27	1.4411	0.3303	-0.45851	-0.31671	1.138	1.073	0.142	0.131	-0.066
28	1.4529	0.3587	-0.24759	-0.28190	1.039	1.056	-0.034	0.066	-0.066
29	1.4645	0.3867	-0.09660	-0.24387	0.962	1.037	-0.147	0.0	-0.029
30	1.4761	0.4146	-0.07044	-0.20744	0.949	1.019	-0.137	0.0	-0.029
31	1.4877	0.4425	-0.08214	-0.17419	0.955	1.003	-0.092	0.0	0.0
32	1.4994	0.4705	-0.08808	-0.14534	0.958	0.988	-0.057	0.0	0.0
33	1.5111	0.4987	-0.08241	-0.12003	0.955	0.975	-0.038	0.0	0.0
34	1.5230	0.5272	-0.07014	-0.09618	0.948	0.962	-0.026	0.0	0.0
35	1.5349	0.5559	-0.05361	-0.07376	0.939	0.950	-0.020	0.0	0.0
36	1.5470	0.5850	-0.03522	-0.05242	0.929	0.939	-0.017	0.0	0.0
37	1.5592	0.6143	-0.01650	-0.03178	0.919	0.928	-0.015	0.0	0.0
38	1.5715	0.6439	0.00207	-0.01153	0.909	0.916	-0.014	0.0	0.0
39	1.5839	0.6737	0.02002	0.00806	0.899	0.905	-0.012	0.0	0.0
40	1.5964	0.7037	0.03748	0.02686	0.889	0.895	-0.011	0.0	0.0
41	1.6088	0.7336	0.05485	0.04516	0.879	0.884	-0.010	0.0	0.0
42	1.6212	0.7634	0.07161	0.06223	0.869	0.875	-0.009	0.0	0.0
43	1.6334	0.7927	0.08767	0.07811	0.860	0.865	-0.010	0.0	0.0
44	1.6452	0.8211	0.10323	0.09324	0.850	0.856	-0.010	0.0	0.0
45	1.6564	0.8481	0.11828	0.10763	0.841	0.848	-0.011	0.0	0.0
46	1.6670	0.8735	0.13263	0.12121	0.833	0.840	-0.011	0.0	0.0
47	1.6768	0.8972	0.14815	0.13531	0.823	0.831	-0.013	0.0	0.0
48	1.6860	0.9193	0.16545	0.15055	0.812	0.822	-0.015	0.0	0.0
49	1.6947	0.9401	0.18379	0.16633	0.801	0.812	-0.017	0.0	0.0
50	1.7031	0.9603	0.20495	0.18606	0.787	0.799	-0.019	0.0	0.0
51	1.7113	0.9801	0.23211	0.21456	0.769	0.781	-0.018	0.0	0.0
52	1.7196	1.0000	0.26607	0.25737	0.747	0.752	-0.009	0.0	0.0
53	1.7281	1.0204	0.25495	0.25426	0.754	0.755	-0.001	0.0	0.0
54	1.7383	1.0449	0.19997	0.19996	0.790	0.790	-0.000	0.0	0.0
55	1.7539	1.0826	0.14946	0.14964	0.822	0.822	0.000	0.0	0.0
56	1.7832	1.1529	0.10231	0.10241	0.851	0.851	0.000	0.0	0.0
57	1.8320	1.2703	0.06573	0.06521	0.872	0.873	-0.001	0.0	0.0
58	1.8851	1.3979	0.05770	0.02219	0.877	0.898	-0.036	0.0	0.0



K=28 SPAN STATION ETA= 0.98182 Y= 2.20909

J	X	X/C	CPU	CPL	MU	ML	DELTA CP	ZSONICU	ZSONICL
2	1.2863	-0.2013	0.07336	0.04464	0.868	0.885	-0.029	0.0	0.0
3	1.3303	-0.0881	0.12959	0.15156	0.834	0.821	0.022	0.0	0.0
4	1.3451	-0.0502	0.19463	0.26447	0.794	0.748	0.070	0.0	0.0
5	1.3520	-0.0323	0.22922	0.35314	0.771	0.685	0.124	0.0	0.0
6	1.3564	-0.0210	0.25018	0.42447	0.757	0.629	0.174	0.0	0.0
7	1.3599	-0.0121	0.26583	0.49113	0.747	0.573	0.225	0.0	0.0
8	1.3630	-0.0040	0.27924	0.56168	0.738	0.507	0.282	0.0	0.0
9	1.3661	0.0040	0.12306	0.46748	0.838	0.594	0.344	0.0	0.0
10	1.3692	0.0120	-0.13208	0.26074	0.981	0.750	0.393	0.131	0.0
11	1.3724	0.0201	-0.28033	0.12942	1.055	0.835	0.410	0.235	0.0
12	1.3756	0.0283	-0.37874	0.02890	1.102	0.894	0.408	0.235	0.0
13	1.3789	0.0369	-0.45625	-0.05268	1.137	0.939	0.404	0.235	0.0
14	1.3825	0.0461	-0.51886	-0.12051	1.164	0.975	0.398	0.235	0.0
15	1.3864	0.0561	-0.56419	-0.17506	1.184	1.003	0.389	0.235	0.0
16	1.3907	0.0672	-0.59508	-0.22043	1.197	1.026	0.375	0.235	0.0
17	1.3956	0.0799	-0.61581	-0.25819	1.206	1.044	0.358	0.235	0.0
18	1.4014	0.0947	-0.62513	-0.28714	1.210	1.058	0.338	0.235	-0.029
19	1.4081	0.1121	-0.62334	-0.30863	1.209	1.069	0.315	0.235	-0.029
20	1.4161	0.1326	-0.61028	-0.32165	1.204	1.075	0.289	0.235	-0.029
21	1.4253	0.1564	-0.58597	-0.32683	1.193	1.077	0.259	0.235	-0.029
22	1.4357	0.1831	-0.54938	-0.32512	1.178	1.077	0.224	0.235	-0.066
23	1.4470	0.2120	-0.49782	-0.31755	1.155	1.073	0.180	0.235	-0.066
24	1.4586	0.2419	-0.42754	-0.30579	1.124	1.067	0.122	0.131	-0.029
25	1.4702	0.2719	-0.33798	-0.29065	1.083	1.060	0.047	0.131	-0.029
26	1.4817	0.3014	-0.23617	-0.26731	1.034	1.049	-0.031	0.066	-0.029
27	1.4929	0.3303	-0.15075	-0.23321	0.991	1.032	-0.082	0.0	-0.029
28	1.5040	0.3587	-0.10683	-0.19566	0.968	1.013	-0.089	0.0	0.0
29	1.5149	0.3867	-0.09491	-0.16240	0.962	0.997	-0.067	0.0	0.0
30	1.5257	0.4146	-0.09238	-0.13502	0.960	0.983	-0.043	0.0	0.0
31	1.5365	0.4425	-0.08574	-0.11128	0.957	0.970	-0.026	0.0	0.0
32	1.5474	0.4705	-0.07371	-0.08980	0.950	0.959	-0.016	0.0	0.0
33	1.5584	0.4987	-0.05884	-0.07008	0.942	0.948	-0.011	0.0	0.0
34	1.5694	0.5272	-0.04325	-0.05169	0.934	0.938	-0.008	0.0	0.0
35	1.5806	0.5559	-0.02751	-0.03454	0.925	0.929	-0.007	0.0	0.0
36	1.5919	0.5850	-0.01177	-0.01810	0.917	0.920	-0.006	0.0	0.0
37	1.6033	0.6143	0.00340	-0.00209	0.908	0.911	-0.005	0.0	0.0
38	1.6148	0.6439	0.01808	0.01341	0.900	0.902	-0.005	0.0	0.0
39	1.6264	0.6737	0.03250	0.02841	0.892	0.894	-0.004	0.0	0.0
40	1.6380	0.7037	0.04681	0.04305	0.883	0.886	-0.004	0.0	0.0
41	1.6497	0.7336	0.06108	0.05724	0.875	0.877	-0.004	0.0	0.0
42	1.6613	0.7634	0.07465	0.07059	0.867	0.870	-0.004	0.0	0.0
43	1.6726	0.7927	0.08728	0.08275	0.860	0.863	-0.005	0.0	0.0
44	1.6837	0.8211	0.09952	0.09414	0.853	0.856	-0.005	0.0	0.0
45	1.6942	0.8481	0.11163	0.10536	0.845	0.849	-0.006	0.0	0.0
46	1.7041	0.8735	0.12393	0.11663	0.838	0.842	-0.007	0.0	0.0
47	1.7132	0.8972	0.13681	0.12813	0.830	0.835	-0.009	0.0	0.0
48	1.7218	0.9193	0.15080	0.14035	0.821	0.828	-0.010	0.0	0.0
49	1.7299	0.9401	0.16656	0.15401	0.812	0.819	-0.013	0.0	0.0
50	1.7378	0.9603	0.18561	0.17174	0.800	0.808	-0.014	0.0	0.0
51	1.7455	0.9801	0.21091	0.19745	0.783	0.792	-0.013	0.0	0.0
52	1.7532	1.0000	0.24798	0.23569	0.759	0.767	-0.012	0.0	0.0
53	1.7611	1.0204	0.23569	0.22822	0.767	0.772	-0.007	0.0	0.0
54	1.7707	1.0449	0.17312	0.17141	0.807	0.809	-0.002	0.0	0.0
55	1.7853	1.0826	0.12108	0.12110	0.840	0.840	0.000	0.0	0.0
56	1.8126	1.1529	0.07892	0.07901	0.865	0.865	0.000	0.0	0.0
57	1.8583	1.2703	0.05072	0.05000	0.881	0.882	-0.001	0.0	0.0
58	1.9078	1.3979	0.03568	0.03014	0.890	0.893	-0.006	0.0	0.0



GRUMMAN AMES TRANSONIC VISCOUS WING BODY ANALYSIS PROGRAM

WILLIAM F. BALLHAUS (USAAMRDL) — WILLIAM H. MASON
JUANITA FRICK (INFORMATICS INC.) — DONALD A. MACKENZIE
NASA AMES RESEARCH CENTER — MARK A. STERN
MOFFETT FIELD, CALIFORNIA — AERODYNAMICS SECTION, GRUMMAN AEROSPACE CORP., BETHPAGE, NEW YORK

PROGRAM DEVELOPED FOR THE AIR FORCE FLIGHT DYNAMICS LAB, WPAFB, DAYTON OHIO

RAE WING BODY CONFIGURATION

REFERENCE CHORD IS CBAR= 0.750
MOMENT ORIGIN IS XWING = 0.0

MACH = 0.910 ALPHAW = 1.00 ALPHAB = 1.00

SPANWISE FORCE DISTRIBUTIONS

K	Y	ETA	C/CAVE	C*CN/CAVE	C*CA/CAVE	C*CL/CAVE	C*CD/CAVE	C*CM/CAVE	CN	CA	CL	CD	CM	XCP/C	K
1	0.0	0.0	1.500	0.143	0.051	0.142	0.0532	-0.069	0.095	0.034	0.095	0.0355	-0.031	0.570	1
2	0.082	0.036	1.464	0.141	0.034	0.141	0.0360	-0.070	0.096	0.023	0.096	0.0246	-0.033	0.539	2
3	0.164	0.073	1.427	0.141	0.024	0.141	0.0268	-0.074	0.099	0.017	0.099	0.0188	-0.036	0.513	3
4	0.245	0.109	1.391	0.138	0.018	0.138	0.0199	-0.074	0.099	0.013	0.099	0.0143	-0.038	0.480	4
5	0.327	0.145	1.355	0.134	0.012	0.134	0.0143	-0.075	0.099	0.009	0.099	0.0106	-0.041	0.446	5
6	0.409	0.182	1.318	0.131	0.007	0.130	0.0095	-0.075	0.099	0.006	0.099	0.0072	-0.043	0.412	6
7	0.491	0.218	1.282	0.129	0.003	0.129	0.0056	-0.080	0.101	0.003	0.101	0.0044	-0.048	0.390	7
8	0.573	0.255	1.245	0.129	0.000	0.129	0.0022	-0.084	0.103	0.000	0.103	0.0018	-0.054	0.369	8
9	0.655	0.291	1.209	0.127	-0.003	0.127	-0.0006	-0.089	0.105	-0.002	0.105	-0.0005	-0.061	0.348	9
10	0.736	0.327	1.173	0.125	-0.005	0.125	-0.0030	-0.092	0.106	-0.004	0.106	-0.0026	-0.067	0.323	10
11	0.818	0.364	1.136	0.122	-0.007	0.122	-0.0050	-0.095	0.107	-0.006	0.107	-0.0044	-0.074	0.299	11
12	0.900	0.400	1.100	0.119	-0.009	0.119	-0.0065	-0.098	0.108	-0.008	0.108	-0.0059	-0.081	0.275	12
13	0.982	0.436	1.064	0.115	-0.010	0.116	-0.0075	-0.101	0.109	-0.009	0.109	-0.0071	-0.089	0.252	13
14	1.064	0.473	1.027	0.113	-0.010	0.113	-0.0082	-0.104	0.110	-0.010	0.110	-0.0080	-0.099	0.234	14
15	1.145	0.509	0.991	0.110	-0.010	0.110	-0.0085	-0.108	0.111	-0.011	0.111	-0.0086	-0.110	0.217	15
16	1.227	0.545	0.955	0.107	-0.011	0.107	-0.0087	-0.111	0.112	-0.011	0.112	-0.0091	-0.122	0.201	16
17	1.309	0.582	0.918	0.104	-0.011	0.104	-0.0087	-0.115	0.113	-0.011	0.114	-0.0095	-0.136	0.187	17
18	1.391	0.618	0.882	0.101	-0.010	0.101	-0.0086	-0.118	0.115	-0.012	0.115	-0.0098	-0.152	0.176	18
19	1.473	0.655	0.845	0.098	-0.010	0.098	-0.0084	-0.120	0.116	-0.012	0.116	-0.0099	-0.168	0.165	19
20	1.555	0.691	0.809	0.095	-0.010	0.095	-0.0080	-0.123	0.117	-0.012	0.117	-0.0099	-0.188	0.158	20
21	1.636	0.727	0.773	0.091	-0.009	0.091	-0.0075	-0.125	0.118	-0.012	0.118	-0.0098	-0.209	0.152	21
22	1.718	0.764	0.736	0.087	-0.009	0.087	-0.0071	-0.125	0.118	-0.012	0.118	-0.0096	-0.230	0.147	22
23	1.800	0.800	0.700	0.082	-0.008	0.082	-0.0068	-0.124	0.117	-0.012	0.117	-0.0097	-0.253	0.140	23
24	1.882	0.836	0.664	0.076	-0.008	0.076	-0.0066	-0.120	0.114	-0.012	0.114	-0.0099	-0.272	0.130	24
25	1.964	0.873	0.627	0.068	-0.008	0.068	-0.0066	-0.113	0.109	-0.013	0.109	-0.0108	-0.286	0.112	25
26	2.045	0.909	0.591	0.059	-0.009	0.059	-0.0076	-0.101	0.100	-0.015	0.100	-0.0128	-0.290	0.087	26
27	2.127	0.945	0.555	0.048	-0.010	0.048	-0.0092	-0.085	0.086	-0.018	0.086	-0.0165	-0.275	0.053	27
28	2.209	0.982	0.518	0.031	-0.012	0.031	-0.0117	-0.056	0.059	-0.024	0.060	-0.0226	-0.210	0.001	28

TOTAL FORCE COEFFICIENTS

(BASED ON SREF)

SREF= 1.688 STRUE= 1.687 SEXPOSED= 1.687
AR REF= 6.000 AR TRUE= 6.000

CN = 0.10461 XCP= 0.6940 YCP= 1.1837

CA = -0.00180 CDF= 0.0039(UPPER)

CM = -0.09682 CDF= 0.0040(LOWER)

SECTION II

CODE DESCRIPTION

1. INTRODUCTION

Experience has shown that large computer programs are continuously being revised. This occurs because users continually demand different types of information from the program and various sections of the code require revision as new theories are developed. In this part of the volume, the details of the program are presented in order to minimize the difficulty of revising the program. After an overall description, the detailed description of the COMMON BLOCKS, Tape/Disc I/O, and the subroutines are presented. The graphics package is described separately since it has been maintained as a separate package and the details of this portion of the program will necessarily be site dependent.

2. AN OVERVIEW OF THE PROGRAM

The program was developed on the CDC 7600 computer located at the NASA Ames Research Center. This computer has a "small core" of 160K octal which is intended to be used for numerical calculations. A "large core" is available for block storage of data. Large core size is essentially unlimited. These features control the arrangement of the program. The IBM version of the program documented in this volume makes some concessions in storage space required in order to remain as similar to the CDC version as possible. This allows for easy conversion of any further updates generated on the baseline program being used at NASA Ames. The program resides in the "UPDATE" format on CDC systems. Conversion from CDC to IBM is then performed automatically by inserting a special "IBM" ident set of updates, so that the necessary modifications are made and the UPDATE source file created can be used to generate a tape or card deck for an IBM program. Level 2 (or large core) storage in CDC becomes part of the normal core storage in the IBM version, leading to a large core requirement. However, this is precisely the type of job for which the IBM operating systems with the VS feature are designed to handle. We expect that this background information will be helpful to those users interested in actually manipulating and revising the program.

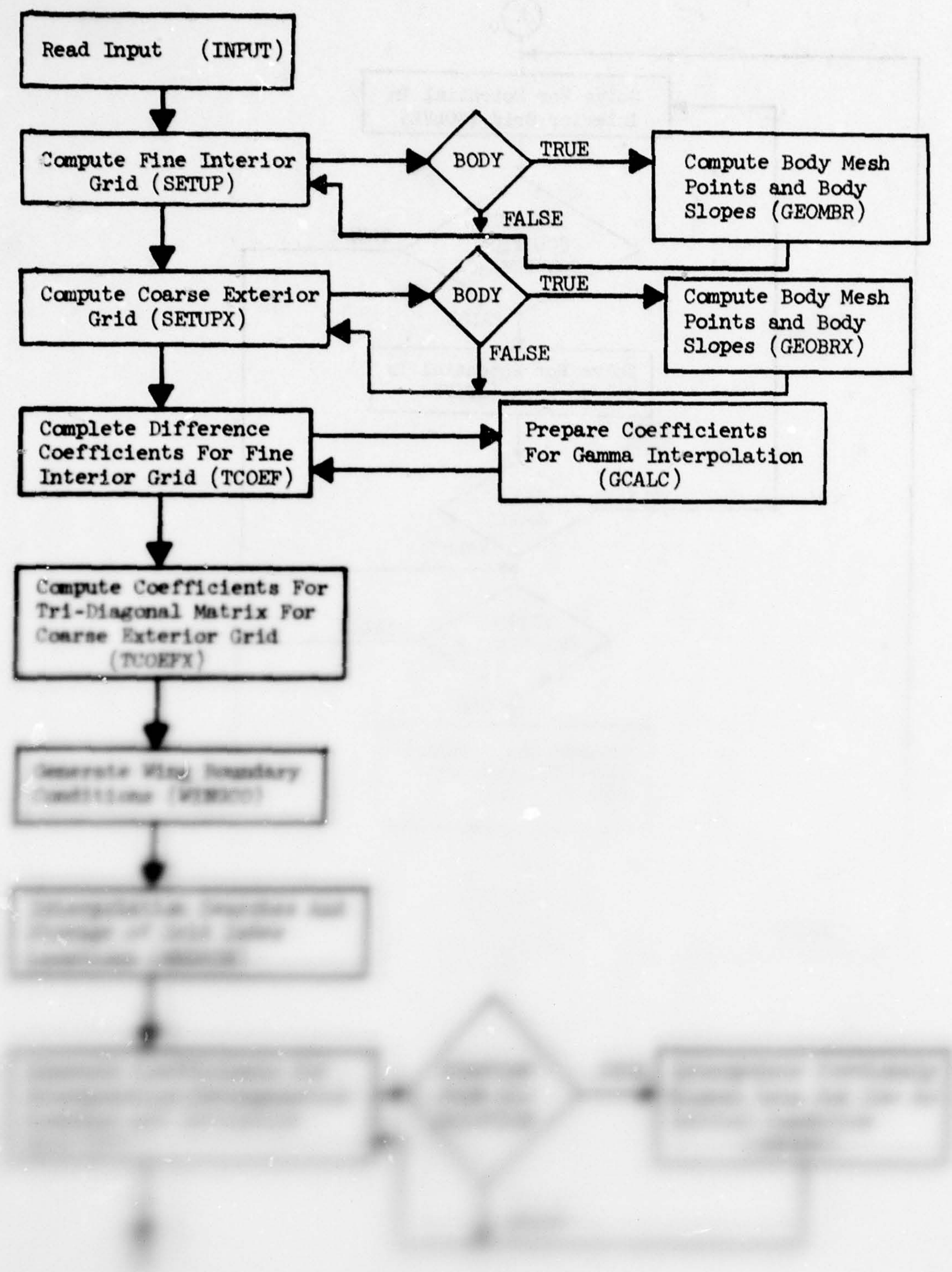
A single main program controls the computation. Figure 1 shows the flow of the program. Most of the computation setup is sequential with the only loops in the main program used to iterate between the fine and crude grid solutions

for the potential, and a loop to iteratively determine the viscous effects. After this iteration procedure is completed, the pressure distribution and the resulting force distribution is computed, the solution is stored for future use if requested and the program stops.

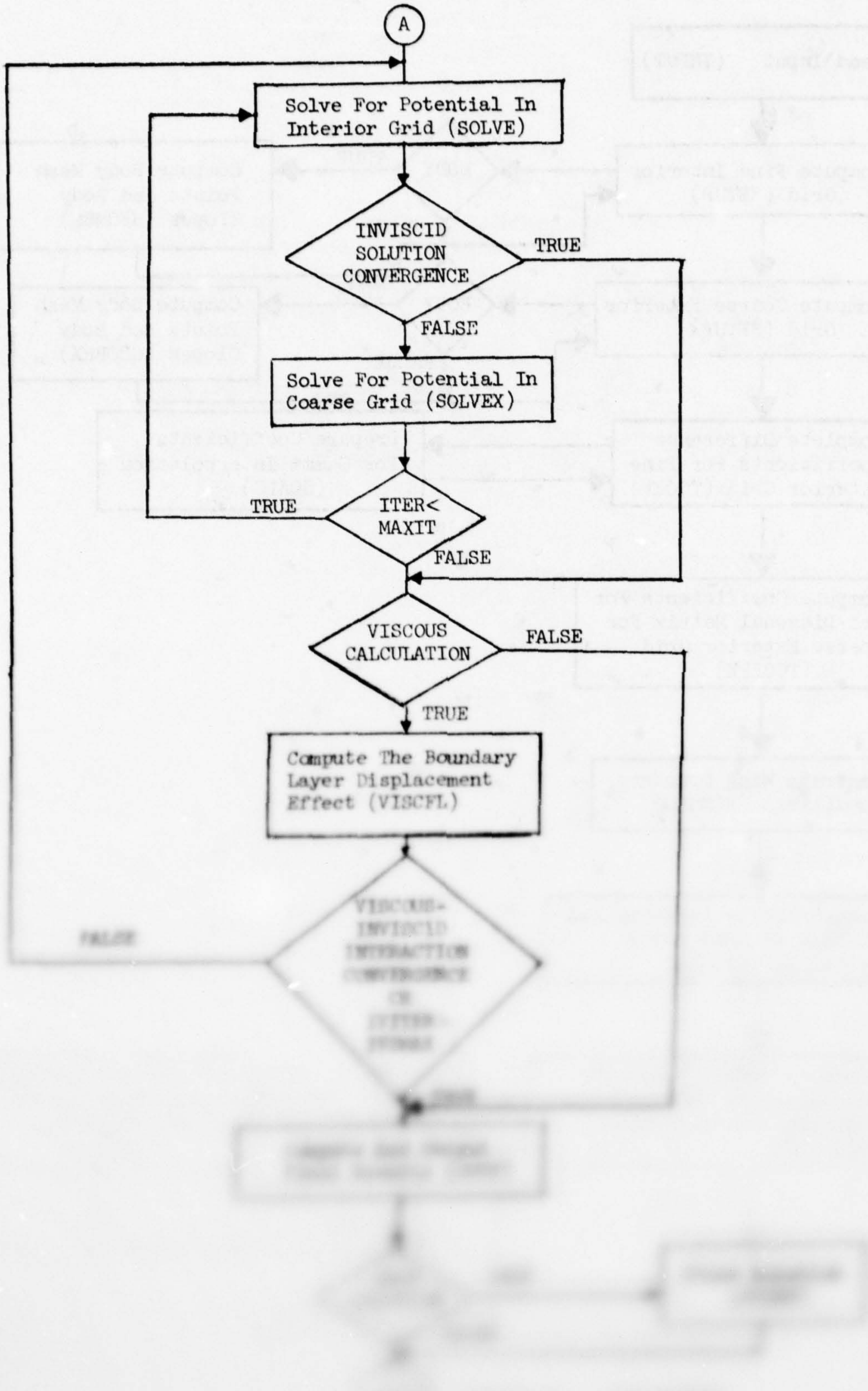
The final program is a combination of the basic inviscid program with an infinite yawed wing boundary layer program called STRIPK, which is the standard boundary layer subprogram employed in a number of codes at Grumman. STRIPK itself is composed of separate programs to compute laminar and turbulent boundary layers. The laminar program is simply a compressible version of the method of Thwaites. The turbulent boundary layer is computed by the modified chord method, which is based on the widely used program by Bradshaw and co-workers. The program that provides the interface between the inviscid solution and the boundary layer calculation is called VISCFL. This routine also provides the local strong interaction treatments at the trailing edge, and for shallow separations also. VISCFL and STRIPK both use a number of interpolation routines that are basically a part of the inviscid program.

Subroutine Murman is called directly from SOLVE and is operated essentially independently of the weak interaction and trailing edge separation effects, which are computed in VISCFL.

The program also contains some routines associated with a previous version which could treat mid-mounted axisymmetric fuselages more precisely than the BCSS. Although this option is not available in the current code, the remnants of this capability have been left in tact in order to allow code modification along these lines if the user desires to do so. The routine TOPBOD could be used to replace the body slopes with wing/slopes on the top of the body. This subroutine is not used in the present version because the fuselage fairing is not properly accounted for using TOPBOD.



Read Input (INPUT)
Compute Fine Interior Grid (SETUP)
BODY
TRUE
FALSE
Compute Body Mesh Points and Body Slopes (GEOMBR)
Compute Coarse Exterior Grid (SETUPX)
BODY
TRUE
FALSE
Compute Body Mesh Points and Body Slopes (GEOBRX)
Complete Difference Coefficients For Fine Interior Grid (TCOEF)
Prepare Coefficients For Gamma Interpolation (GCALC)
Compute Coefficients For Tri-Diagonal Matrix For Coarse Exterior Grid (TCOEFX)


A
Solve For Potential In Interior Grid (SOLVE)
INVISCID SOLUTION CONVERGENCE
TRUE
FALSE
Solve For Potential In Coarse Grid (SOLVEX)
ITER< MAXIT
TRUE
FALSE
VISCOUS CALCULATION
FALSE
TRUE
Compute The Boundary Layer Displacement Effect (VISCFL)

3. COMMON BLOCKS

COMMON	USED IN					
INTER	INPUT	SETUP	GEOMB	GEOMBR	TCOEF	MESHIN	WINGCO
	IC	INTERP	SOLVE	STORE	FARBDY	WNGBDY	BODBDY
	GCALC	DBNDY	PHIBOD	OUTBOD	OUTP	FORCE	TOPBOD
	BEND	FINGRD	VISCFL	VTRANS	CPCALC	CLCALC	BAVITZ
	GRAPH3	QUIK	BLOUT	MURMAN	XLDX	QUIKX	SAVSOL
EXTER	INPUT	SETUPX	GEOBRX	TCOEFX	MESHIN	IC	INTERP
	FARBDY	SOLVEX	WNGBDY	BODBDY	DBNDYX	CRDGRD	QUIKX
	SAVSOL						
INDEX	INPUT	SETUP	GEOMB	GEOMBR	TCOEF	MESHIN	WINGCO
	IC	INTERP	SOLVE	STORE	FARBDY	WNGBDY	BODBDY
	GCALC	DBNDY	PHIBOD	OUTBOD	OUTP	FORCE	TOPBOD
	BEND	FINGRD	VISCFL	VTRANS	CPCALC	CLCALC	GRAPH3
	MAIN	BAVITZ	QUIK	BLOUT	MURMAN	XLDX	QUIKX
	SAVSOL						
INDEXX	INPUT	SETUPX	GEOBRX	TCOEFX	MESHIN	IC	INTERP
	FARBDY	SOLVEX	WNGBDY	BODBDY	DBNDYX	CRDGRD	QUIKX
	SAVSOL						
FLAGS	INPUT	SETUP	SETUPX	GEOMB	GEOMBR	GEOBRX	TCOEF
	MESHIN	WINGCO	IC	INTERP	SOLVE	FARBDY	SOLVEX
	GCALC	PIBOD	OUTP	VTRANS	GRAPH3	MAIN	BLKDAT.
	WNGBDY	FORCE	VISCFL	CPCALC	CLCALC	FINGRD	CRDGRD
	QUIK	MURMAN	XLDX	QUIKX	SAVSOL		
PARM	INPUT	SETUP	TCOEF	TCOEFX	WINGCO	SOLVE	SOLVEX
	DBNDY	DBNDYX	OUTP	FORCE	VISCFL	VTRANS	CPCALC
	CLCALC	BVITZ	GRAPH3	BLKDAT.		SETUPX	IC
	MURMAN	BLOUT					
RELAXP	INPUT	SETUP	WINGCO	IC	SOLVE	SOLVEX	DBNDY
	DBNDYX	MAIN	BLKDAT.		FINGRD		
WING	INPUT	SETUP	SETUPX	GEOMBR	GEOBRX	TCOEF	TCOEFX
	WINGCO	SOLVE	SOLVEX	WNGBDY	OUTP	FORCE	SCALE
	BEND	FINGRD	CRDGRD	VISCFL	VTRANS	CPCALC	CLCALC
	SAVITZ	TRIISO	SLETE	GRAPH3	BLKDAT.		BLOUT
	SAVSOL	XLDX					
BODY1	INPUT	SETUP	GEOMB	GEOMBR	GEOBRX	MESHIN	IC
	INTERP	SOLVE	STORE	FARBDY	SOLVEX	BODBDY	GCALC
	DBNDY	DBNDYX	PHIBOD	OUTBOD	OUTP	TOPBOD	BEND
	GRAPH3	BLKDAT.		SETUPX	FORCE	CRDGRD	ELIPSE
	QUIKX	SAVSOL	QUIK				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	IC
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

	BLKDAT.		SETUPX	FORCE	CRDGRD	ELIPSE	QUIK
	SAVSOL	QUIKX					
BODV3	INPUT	SETUP	GEOMB	GEOMBR	GEOBRX	MESHIN	IC
	INTERP	SOLVE	STORE	FARBDY	SOLVEX	BODBDY	GCALC
	DBNDY	DBNDYX	PHIBOD	OUTBOD	OUTP	TOPBOD	BEND
	BLKDAT.		SETUPX	FORCE	CRDGRD	ELIPSE	QUIK
	SAVSOL	QUIKX					
BODYBC	INPUT	SETUP	GEOMB	GEOMBR	GEOBRX	MESHIN	IC
	INTERP	SOLVE	STORE	FARBDY	SOLVEX	BODBDY	GCALC
	DBNDY	DBNDYX	PHIBOD	OUTBOD	OUTP	TOPBOD	BEND
	BLKDAT.		SETUPX	FORCE	CRDGRD	ELIPSE	QUIK
	SAVSOL	QUIKX					
JUMP	INPUT	IC	SOLVE	STORE	SOLVEX	WNGBDY	BODBDY
	GCALC	DBNDY	DBNDYX	PHIBOD	OUTP	VISCFL	CPCALC
	CLCALC	XLDX	SAVSOL				
LABEL	INPUT	GRAPH3	FORCE	BLOUT	SAVSOL		
XYCOE	SETUP	SETUPX	MESHIN	WINGCO	SOLVE	SOLVEX	WNGBDY
	BODBDY	DBNDY	DBNDYX	OUTP	FORCE	GRAPH3	TCOEF
	VISCFL	VTRANS	CPCALC	BAVITZ	SAVSOL		
LARGN	TCOEF	IC	INTERP	SOLVE	FARBDY	WNGBDY	BODBDY
	DBNDY	PHIBOD	OUTBOD	OUTP	FORCE	PCINT	VTRANS
	CPCALC	BAVITZ	MURMAN	SAVSOL			
LCO	TCOEF	SOLVE	DBNDY	OUTP	FORCE	DSTPLT	SPNPLT
	CPPLOT						
LCOX	TCOEF	TCOEFX	SOLVEX	DBNDY	DBNDYX		
LARGX	TCOEFX	IC	INTERP	FARBDY	SOLVEX	BODBDY	DBNDYX
	PFINT	WNGBDY	SAVSOL				
MESHCO	MESHIN	FARBDY	SOLVEX	WNGBDY	BODBDY		
WINGBC	WINGCO	SOLVE	PHIBOD	FORCE	TOPBOD	TCOEF	VISCFL
	VTRANS	CPCALC	BAVITZ	BLOUT	MURMAN		
OLD	IC	INTERP	STORE				
SCRACH	INTERP	SOLVE	SOLVEX	OUTP	FORCE	MURMAN	
FARBY	INTERP	SOLVE	SOLVEX	DBNDY	DBNDYX	CLCALC	
[illegible]	SOLVE	SOLVEX	MAIN				

LOCAL	OUTP						
VSCINP	INPUT	VISCFL	CPCALC	MAIN	BLKDAT.		IC
	SAVSOL	BLOUT					
CPCAL	VISCFL	CPCALC	BAVITZ	IC	SAVSOL		
VITERP	VISCFL	VTRANS	CPCALC	BAVITZ	IC	SAVSOL	
SZT	VISCFL	BAVITZ	SAVSOL				
YAWOPT	VISCFL	VTRANS	CPCALC	CLCALC	BAVITZ	INPUT	SETUP
	SETUPX	WINGCO	IC	SOLVE	FARBDY	SOLVEX	WNGBDY
	OUTP	FORCE	MURMAN	XLDX	SAVSOL		
VISCOM	VISCFL						
LOCAL2	VISCFL						
VSFCOM	VISCFL	BLKDAT.		INPUT	BAVITZ		
WINGX	VISCFL	VTRANS	BAVITZ	WINGCO	MURMAN		
THRED	VBRAD	GORD	RLORD				
EXTEND	ORDIN	VBRAD	BLIAM				
REDUC	VBRAD	REDUCX					
VTRAN2	VTRANS						
SZC	BAVITZ						
FORCES	SPNPLT	GRAPH3					
ISOGM	TRIISO	GRAPH3					
BAVCOM	BAVITZ						
NSBL	INPUT	WINGCO	OUTP	FORCE	BLOUT		
BODV4	INPUT	SETUP	ELIPSE	QUIK	QUIKX		
MESHX	SETUPX	FINGRD	BLKDAT.		INPUT		
VELOC	SOLVE	MURMAN					

COMMON	USED IN
MUREXT	MURMAN
BLCOM	BLKDAT. INPUT BLOUT
MURCOM	BLKDAT. INPUT SOLVE MURMAN
YAW1	SETUP SOLVE
YAW2	SETUPX SOLVEX
LEV1X	GEOMBR GEOBRX WINGCO SLOPY SPLN1 SMTH SCALE SLOPY2 VISCFL
SAVES	IC VTRANS SAVSOL
SKINFR	FORCE VISCFL
CPOD	CPCALC

a. Summary Map of Common Blocks

COMMON BLOCK NAME / SUBROUTINE NAME	INTER	EXTER	INDEX	INDEXX	FLAGS	PARM	RELAXP	WING	BODV1	BODV2	BODV3	BODYBC	JUMP	LABEL	XYCOE	LARGN	LCO	LCOX	LARGX	MESHCO	WINGBC	OLD	SCRACH	PARRY	EPLT	LOCAL	VSCINP	CPCAL	VITERP	SZT	YAWOPT	VISCOM	LOCAL2	VSPCOM	WINGX	THRED	EXTEND	REDUC	VTRAN2	SZC	FORCES	ISOGM	BAVCOM	NSBL	BODV4	MESHX	VELOC	MUREXT	BLCOM	MURCOM	YAW1	YAW2	LEV1X	SAVES	SKINFR	CPOD
MAIN			X		X		X																		X		X																													
BLKDAT					X	X	X	X	X	X	X	X															X							X												X			X	X						
INPUT	X	X	X	X	X	X	X	X	X	X	X	X	X	X													X				X			X										X	X	X			X	X						
SETUP	X		X		X	X	X	X	X	X	X	X			X																X													X	X					X					
SETUPX		X		X	X	X		X	X	X	X	X			X																X																				X				
GEOMBR	X		X		X			X	X	X	X	X																																									X			
GEOBRX		X		X	X			X	X	X	X	X																																									X			
TCOEF	X		X		X	X		X							X	X	X	X			X																																		
TCOEFX		X		X		X		X										X	X																																					
MESHIN	X	X	X	X	X				X	X	X	X			X					X																																				
WINGCO	X		X		X	X	X	X							X							X									X				X								X									X			
TOPBOD	X		X						X	X	X	X									X																																		
SLOPY																																																					X			
SPLN1																																																					X			
SMTH																																																					X			
IC	X	X	X	X	X	X	X		X	X	X	X	X			X			X			X					X	X	X		X	X																						X		
INTERP	X	X	X	X	X				X	X	X	X				X			X			X	X	X																																
SOLVE	X		X		X	X	X	X	X	X	X	X	X		X	X	X				X		X	X	X						X															X			X	X					
STORE	X		X						X	X	X	X	X									X																																		
FARBDY	X	X	X	X	X				X	X	X	X				X			X	X											X																								
PFINT																			X																																					
SOLVEX		X		X	X	X	X	X	X	X	X	X	X		X			X	X	X			X	X	X						X																				X				
WNGBDY	X	X	X	X	X			X					X		X	X			X	X											X																								
PCINT																X																																								
BODBODY	X	X	X	X					X	X	X	X	X		X	X			X	X																																				
GCALC	X		X		X				X	X	X	X	X																																											
DBNDY	X		X			X	X		X	X	X	X	X		X	X	X	X						X																																
OUTP	X		X		X	X		X	X	X	X	X	X		X	X	X						X			X					X												X												
FORCE	X		X		X	X		X	X	X	X	X		X	X	X	X				X		X									X												X											X	
SIMP																																																								
ERPLOT																																																								
SCALE								X																																													X			
SLOPY2																																																					X			
SPLIFM																																																								
SPLIF																																																								
XMESH																																																								
XC2																																																								
VISCFL	X		X		X	X		X					X		X							X						X	X	X	X	X	X	X	X	X									X		X										
VBRAD																																				X	X	X																		
BLLAM																																					X																			
STRIPK																																																								
FINT																																																								
GORD																																				X																				
GRAD																																																								
ORDIN																																					X																			
RLORD																																				X																				
SIMPSN																																																								
SLOPE																																																								
SOLVEB																																																								
SPRINT																																																								
TANCAL																																																								
VNUSUB																																																								
REDUCX																																						X																		
VTRANS	X		X		X	X		X							X	X					X								X		X	X			X				X															X		
CPCALC	X		X		X	X		X					X		X	X					X						X	X	X		X																								X
CLCALC	X		X		X	X		X					X											X							X																								
BAVITZ	X		X			X		X							X	X					X							X	X	X	X			X	X					X			X													
VINTER																																																								
SLOPQ																																																								
BEND	X		X					X	X	X	X	X																																												
FINGRD	X		X		X		X	X																																						X										
CRDGRD		X		X	X			X	X	X	X	X																																												
DATTRN																																																								
ELIPSE									X	X	X	X																																	X											
QUIK	X		X		X				X	X	X	X																																	X											
BLOUT	X		X			X		X						X							X																						X					X							
MURMAN	X		X		X	X										X					X		X								X				X											X	X		X						
POUT																																																								
XLDX	X		X		X			X					X																		X																								
QUIKX	X	X	X	X	X				X	X	X	X																																	X											
SAVSOL	X	X	X	X	X			X	X	X	X	X	X	X	X	X			X								X	X	X	X	X	X																						X		
DBNDYX		X		X		X	X		X	X	X	X	X		X			X	X					X																																
SLETE								X																																																
SPNPLT																	X																								X														
DSTPLT																	X																																							
CPPLOT																	X																																							
TRIISO								X																																		X													
[illegible]	X		X		X	X		X	X					X	X																										X	X															
[illegible]	X		X		X				X	X	X	X																																												
[illegible]	X		X		X				X	X	X	X	X			X					X																																		
[illegible]	X		X						X	X	X	X				X																																								
[illegible]	X	X	X	X	X	X	X	X	X	X	X			X	X						X																							X											

b. Common Block Listing

```
COMMON                VARIABLE NAME

COMMON / WINGBC / ZLWL       , ZRWU        , TWIST(30) ,
1                 WBCL(30,90)              , WBCU(30,90)
  LEVEL 2,        ZLWL

COMMON / LARGN /  PF(20,30,90)             , DJK1(30,90)          ,
1                 DJK2(30,90)              , DJK3(30,90)          ,
2                 DJK4(30,90)              , DJK5(30,90)          ,
3                 DJK6(30,90)              , DJK7(30,90)          ,
4                 DJK8(30,90)              , DJK9(30,90)          ,
5                 DJK10(30,90)             , DJK11(30,90)
  LEVEL 2,        PF

COMMON / LARGX /  PC(20,20,30)             , DJK10X(20,30)         ,
1                 DJK11X(20,30)            , DJK1X(20,30)
  LEVEL 2,        PC

COMMON / INTER /  XI(90)     , ETA(30)     , ZT(20)     , XIN(90)    ,
1                 XIL(90)    , XIC(90)     , XIR(90)    , ETAL(30)   ,
2                 ETAC(30)   , ETAR(30)    , CUFU       , CUFL       ,
3                 ZCVU       , ZLVL        , ZRVL       , ZCVL       ,
4                 PDUM(30)   , EDUM(30)    , XMIN       , XMAX       ,
5                 YMAX       , ZMAX        , YMIN       , ZMIN       ,
6                 ZLVU       , ZRVU

COMMON / EXTER /  XIEX(30)   , ETAX(20)    , ZTX(20)    , XINX(30)   ,
1                 XILX(30)   , XICX(30)    , XIRX(30)   , ETALX(30)  ,
2                 ETACX(20)  , ETARX(20)   , XMINX      , XMAXX      ,
3                 YMAXX      , ZMAXX       , YMINX      , ZMINX      ,
4                 ZLVLX      , ZRVLX       , ZCVLX      , ZLVUX      ,
5                 ZRVUX      , ZCVUX

COMMON / EPLT /   CEF        , ERRUF       , ERRF(1000), CRF        ,
1                 RSDUF      , RSDF(1000), CEX          , ERRUX      ,
2                 ERRX(1000), CRX          , RSDUX      , RSDX(1000)
  LEVEL 2,        CEF

COMMON / LABEL /  TITLE(8)

COMMON / BODV4 /  XUCL(90)   , ZUCL(90)    , XLCL(90)   , ZLCL(90)   ,
1                 XZMHB(90)  , ZMHB(90)    , XYMHB(90)  , YMHB(90)   ,
2                 NUCL       , NLCL        , MHBZ       , MHBY       ,
3                 ZUCLI(90)  , ZUCLIP(90), ZLCLI(90)    , ZLCLIP(90),
4                 ZMHBI(90)  , ZMHBIP(90), YMHBI(90)    , YMHBIP(90)
  LEVEL 2,        XUCL

COMMON / NSBL /   XOUTA(30,90)             , ZOCU(30,90)              ,
1                 ZOCL(30,90)              , CPU(30,90), CPL(30,90),
2                 ZLE(30)
  LEVEL 2,        XOUTA

COMMON / MUREXT / W(30,90,2), XOLD(30,2)
  LEVEL 2,        W

COMMON / VELOC /  UMK(30,50,2)             , V(30,50,2),
1                 FMU(30,50,2)
  LEVEL 2,        UMK

COMMON / MURCOM / F          , SHIFT       , MBSTRT     , MBPRNT

COMMON /YAW1/     T(20,90)   , T2(20,90)
  LEVEL 2,        T

COMMON /YAW2/     T(20,30)   , T2(20,30)
  LEVEL 2,        T
```

COMMON	VARIABLE NAME

```
 COMMON / MESHX  / DXL        , DXT        , DXMX       , NF          ,
1                  NB         , XDST       , XLG        ,
2                  DXLI       , DXTI       , DXMXI      , NFI         ,
3                  NBT        , XDSTI      , XLGI       ,
4                  IOUT1      , IOUT2

 COMMON / BLCOM  / IT         , IOITER     , IOPRF      , IPUNCH      ,
1                  KSMTH      , CONV       , LTRN       , SCALE       ,
2                  PRES       , TEMP       , IBOUT

 COMMON / CPCAL /  AVCHGU(30), AVCHGL(30), DCPMXU(30), DCPMXL(30),
1                  CPNL(30)  , CPOL(30)  , JMXL(30)  , CPNU(30)  ,
2                  CPOU(30)  , EPS1      , EPS2      , CMAXDT    ,
3                  CMAXDB    , CPTBAR    , SONPU(30) , SONPL(30) ,
4                  MACHUP(30), MACHDN(30), SHKPU(30) , SHKPB(30) ,
5                  JMXU(30)  , CPBBAR    , CPU(30,50), CPL(30,50),
6                  EMSQ      , NGRIDS
 LEVEL 2,          AVCHGU

 COMMON / VITERP / XOUTOD(80), ETAOLD(80), DXLSTU(30,50)          ,
1                  DXLSTL(30,50)         , KTMOLF     , NXOLD     ,
2                  K7OLD     , K8OLD
 LEVEL 2,          XOUTOD

 COMMON /LOCAL1/ DZL(100),DZU(100),QL(100),QU(100),XOUT(100),
1 ZD(100),ZU(100),NX
 LEVEL 2,DZL

 COMMON / LOCAL2 / XCBLX(41) , DELPTE(20,30)          , NNX        ,
1                  NNXX      , XSEPU(20,30)           ,
2                  XSEPL(20,30)                       , WBCU1(30,50)
 LEVEL 2,XCBLX

 COMMON / YAWOPT / K1X        , K2X        , K3X        , K4X        ,
1                  K5X        , K6X        , K7X        , K8X        ,
2                  KPIX       , KMIX

 COMMON / VSCINP / IVSMAX     , ISTOP      , IVITER     , IVCON      ,
1                  EPSVIS     , RE         , IOUTP      , ISTEPO     ,
2                  ITRANS     , XTRNT      , XTRNB      , IUNIT      ,
3                  KSMTHX     , K2SMTH     , KENDS      , CHISWP     ,
4                  KWRITE     , LWRITE
 LOGICAL           ISTOP

 COMMON / VSFCOM / RELBL      , EXTNDU     , EXTNDL     , AFCBL1     ,
1                  AFCBL2     , KI         , KO

 COMMON / VISCOM / DZL(50)    , DZU(50)    , QL(50)     , QU(50)     ,
1                  ZD(80)     , ZU(80)     , DDSTL(150), DDSTU(150),
2                  SCFT(30)   , SCFB(30)   , CFFKL(30) , CFFKU(30) ,
3                  DDDSTU(30,50)           , DDDSTL(30,50)          ,
4                  EPSNW1(20), EPSNW2(30), CPUK1(20) , CPLK1(20) ,
5                  CPUK2(20) , CPLK2(20) , DELUK1(20), DELLK1(20),
6                  DELUK2(20), DELLK2(20), CLGG(20)  , EPS1X(20) ,
7                  EPS2X(20) , VOTHET(150)           , ITEX(30)  ,
8                  CPTU(50)  , FTAK(30)  , CPVU(150) , CPTL(50)  ,
9                  CPVLP(150), SBRAL(150), DELSL(150), CFVL(150) ,
A                  CFVU(150) , DELSTU(50), CFZL(150) , DELSTL(50),
B                  CWU(2)    , CWL(2)    , PU(25)    , PL(25)    ,
C                  DELSU(150), CFZU(150) , CPVL(150) , SBRAU(150),
D                  CPVUP(150)
 LEVEL 2,          DZL

 COMMON / WINGX /  WBCUOR(30,90)           , WBCLOR(30,90)
 LEVEL 2,          WBCUOR
```

COMMON VARIABLE NAME

```
COMMON / INDEX /  JMAX      , KMAX      , LMAX      , KTM1      ,
1                 KTIP      , KTIP1     , JWLE      , JLE(30)   ,
2                 JWTE      , JTE(30)   , LWINGL    , LWINGU    ,
3                 JMAX1     , KMAX1     , LMAX1     , KROOT     ,
4                 JP1

COMMON / INDEXX / JMAXX     , KMAXX     , LMAXX     , KTM1X     ,
1                 KTIPX     , KTIP1X    , JLEX(20)  , JTEX(20)  ,
2                 LWNGUX    , LWNGLX    , JMAXX1    , KMAXX1    ,
3                 LMAXX1    , KROOTX    , JP1X

COMMON / MESHCO / JEX(30,90), KEX(30)   , LEX(20)   , DXEX(30,90),
1                 DYEX(30)  , DZEX(20)  , KIN(30)   , JINK(20,30),
2                 LIN(20)   , DYIN(30)  , DZIN(20)  , KINB(20)  ,
3                 DYINB(20) , LINB(20)  , DZINB(20) , JINB(20)  ,
4                 JINKM1(20,30)         , KEXB(30)  , LEXB(20)  ,
5                 DYEXB(30) , DZEXB(20) , JCDN      , JCUP
LEVEL 2,          JEX
COMMON / FLAGS /  IDISK     , ISAVE     , IPLOT     , MSHINT    ,
1                 SOLV      , WBCPRT    , BBCPRT    , BODY      ,
2                 FCR       , ISPAN     , IFINR     , ICRUDR    ,
3                 EXTMSH    , REMESH    , IMAPR     , YAW       ,
4                 IBUMP     , IVISC     , ITWIST    , IFOILT    ,
5                 IBODIN    , AXISYM    , AREA      , IBLOUT
LOGICAL           IDISK     , ISAVE     , IPLOT     , MSHINT    ,
1                 SOLV      , WBCPRT    , BBCPRT    , BODY      ,
2                 FCR       , ISPAN     , IFINR     , ICRUDR    ,
3                 EXTMSH    , REMESH    , IMAPR     , YAW       ,
4                 IBUMP     , IVISC     , ITWIST    , IFOILT    ,
5                 IBODIN    , AXISYM    , AREA      , IBLOUT

COMMON / PARM /   A1        , A2        , A3        , A4        ,
1                 A5        , GAMMA     , MACHNO    , COE       ,
2                 C2        , EMEXP(2)  , CK1(30)   , CK2(30)   ,
3                 CK3(30)   , CK4(30)   , CK51(30)              ,
4                 CK52(30,90)           , CK1X(30)  , CK2X(30)  ,
5                 BLDL      , WCOE
REAL              MACHNO
COMMON / RELAXP / MAXIT     , MAXITN    , MAXITX    , INCR      ,
1                 INCRX     , RTEST     , RTESTX    , RSUB      ,
2                 RSUBX     , RESIDJ(30), EPS       , EPSEX     ,
3                 WI        , WIX       , JRD       , KRD       ,
4                 LRD       , BIGRL     , JE        , KE        ,
5                 LE        , ERROR     , KOUNT     , NSUP      ,
6                 IPASS

COMMON / JUMP /   AZU       , AZL       , BZU       , BZL       ,
1                 CZU       , CZL       , COFF                  ,
2                 PJUMP(30,90)          , PCOEF(30,90)          ,
3                 KPINDX(30,90)         , PJUMPX(20,30)
LEVEL 2,          AZU

COMMON / XYCOE /  X(30,90)  , XIY(30,90), XIX(30)   ,
1                 XIYJ(30,90)           , XX(30)    ,
2                 XIYK(30,90)
LEVEL 2,          X
```

```
COMMON                VARIABLE NAME

COMMON / LCO /        DE1(90)    , DE2(90)    , DE3(90)    , DH1(90)    ,
1                     DH2(90)    , DH3(90)    , DL1(90)    , DL2(90)    ,
2                     DL3(90)

COMMON / LCOX /       DE1X(30)   , DE2X(30)   , DE3X(30)   , DH1X(30)   ,
1                     DH2X(30)   , DH3X(30)   , DL1X(30)   , DL2X(30)   ,
2                     DL3X(30)   , DK1(90)    , DK2(90)    , DK3(90)

COMMON / WING /       YROOT      , XLER       , XTER       , YTIP       ,
1                     XLET       , XTET       , SREF       , SWEEP      ,
2                     NLEI       , YLEI(10)   , XLEI(10)   , STRUE      ,
3                     NTEI       , YTEI(10)   , XTEI(10)   , SXPOS      ,
4                     CROOT      , SSPAN      , THICK(11)  , ZWNGWL     ,
5                     NPAN       , YP(11)     , THETP(11)  , NTWST      ,
6                     YTWST(11)  , INUX(11)   , INLX(11)   , XF(180,11) ,
7                     ZF(180,11) , KSMTHS(11) , XMOM       , XLE(30)    ,
8                     XLEW(30)   , CORD(30)   , CORDW(30)  , CORDIN(11) ,
9                     XTE(30)    , RFACT      , CMEAN      , XTEW(30)   ,
A                     NS0        , NS1        , KX0(12)    , KX1(12)    ,
B                     NX0(12)    , NX1(12)    , YX0(12,10) , YX1(12,10) ,
C                     XX0(12,10) , XX1(12,10) , DXR0(12)   , DXR1(12)   ,
D                     DXT0(12)   , DXT1(12)   , ALPHAW     , NTIPLE     ,
E                     NTIPXI     , XLEWX(30)  , XTEWX(30)  , CORDX      ,
F                     CAV        , XOR        , XLEWP(30)  , XTEWP(30)  ,
G                     KSWICH
 LEVEL 2,             YROOT

COMMON / BODV1 /      XNOSE      , XTAIL      , NBIN(2)    , XBIN(2,35) ,
1                     NBODS      , JBUP(2)    , JBDN(2)    , JNOSE      ,
2                     JTAIL      , ALPHAB     , NBPTS(90)  , R(90)      ,
3                     KBMX(90)   , LMN        , LMX        , AFK(15)    ,
4                     BFK(15)    , CFK(15)    , AFL(15)    , BFL(15)    ,
5                     CFL(15)    , ABL(15)    , BBL(15)    , CBL(15)    ,
6                     ACL(2)     , BCL(2)     , CCL(2)     , BTYPE      ,
7                     XRBU(90)   , XRBL(90)   , DZRBU(90)  , DZRBL(90)  ,
8                     NRBU       , NRBL       , YRB        , ZRBU       ,
9                     ZRBL       , KBMXX(30)  , JNOSEX     , JTAILX     ,
A                     RBIN(2,35) , XNOSEX     , XTAILX     , YQB
COMMON / BODV2 /      FX(30,90)  , FY(30,90)  , FZ(30,90)               ,
1                     KBOD(30,90)             , LBU(20,90) , LBD(20,90) ,
2                     NBPTSX(30) , LBOD(30,90)             ,
3                     LBUX(20,30)             , LBDX(20,30)             ,
4                     FYY(20,30) , CPS(20,90)
 LEVEL 2,             FX
COMMON / BODV3 /      KBMAX      , KBMAXX     , LLBL       , LLBU       ,
1                     LLBLX      , LLBUX      , RBCU(30,90)             ,
2                     KBS        , RBCL(30,90)             ,
3                     RBCUX(20,30)            , RBCLX(20,30)            ,
4                     DRBCU      , DRBCL      , DRBCUX     , DRBCLX     ,
5                     SALPH(90)  , SALPHX(30)
COMMON / BODYBC /     TBUD       , TBLD       , IBSIDE     , ETABU(10)  ,
1                     ETABL(10)  , ZBOD(20)   , NRBS       , XRBS(100)
 LEVEL 2,             KBMAX

COMMON / SCRACH /     MU(20,30,2)             , POLD(20,30,3)           ,
1                     VC2(20,30,2)            , VC(20,30,2)
 LEVEL 2,             MU

COMMON / PARRY /      P(20,30,4)

COMMON / OLD /        XIO(90)    , ETAO(30)   , ZTO(20)    , PJUMPU(30) ,
1                     LBUO(20,90)             , LBDO(20,90)             ,
2                     PJUMPT(30) , KBMXO(90)  , JMO        , KMO        ,
3                     LMO        , JTAILO     , JNOSEO     , LWUO       ,
4                     FINE
LOGICAL               FINE
LEVEL 2,              XIO
```

COMMON VARIABLE NAME

```
COMMON / VTRAN2 / DELUP(80)  , DELDN(80)  , DU(80)     , DL(80)     ,
1                 DDU(80)    , DDL(80)    , XOUT(50)   , DSLU(80)   ,
2                 DSLL(80)   , DU1(80)    , DL1(80)    , DDDSUI(80),
3                 DDDSLI(80), DDDSUO(80), DDDSLO(80), XOUTO1(80),
4                 CPUI(80)   , CPLI(80)   , CPUO(80)   , CPLO(80)   ,
5                 CPUIX(80)  , CPLIX(80)  , CPUOX(80)  , CPLOX(80)
6                ,NX         ,  NXOLD1
LEVEL 2,          DELUP

COMMON / SZC /    SZT        , FILKLU     , ICARD
LOGICAL           FILKLU

COMMON / SZT /    XOUT(50)   , NX         , SEPL(40)   , K8BL       ,
1                 ZSLPOG(30), ZSLPTE(30), XFILOG     , SEPMIN     ,
2                 DDDSL(30,60)
LEVEL 2,          XOUT

COMMON / BAVCOM / XSEP(4)    , DELSTL(50), CPL2(50)   , DST(50)    ,
1                 ST(50)
LEVEL 2,          XSEP

COMMON /SAVES/    NXO(30)    , XOUTO(30,50)
LEVEL 2,          NXO

COMMON /SKINFR/   CFVISC     , CFTU       , CFTL

COMMON /CPOD/     CPODU(30,50),CPODL(30,50)
LEVEL 2,          CPODU

COMMON /LEV1X/    DXU(90)    , DXL(90)    , XDUM(90)   , XDUM2(90) ,
1                 XDUM3(90)  , XDUM4(90)  , XDUM5(90)  ,
2                 XDUM6(2000)
```

c. Detail Description of Each Common Block

COMMON MNEMONICS

see common in program for list of mnemonics and dimension

COMMON	VARIABLE	SOURCE	DESCRIPTION
INTER	XI	SETUP	(XIN(J)-X0)/DX transformed XIN coordinates at mesh points
	ETA	INPUT PINGRD	ETA coordinate at mesh pts.
	ZT	INPUT PINGRD	ZT coordinate at mesh pts.
	XIN	INPUT SETUP	X mesh along centerline
	XIL	TCOEF	1/(XI(J)-XI(J-1)) coeffs. for first diffs. with respect to point XI
	XIC	TCOEF	2/(XI(J+1)-XI(J-1)) coefs. for first diffs. with respect to point XI
	XIR	TCOEF	1/(XI(J+1)-XI(J)) coefs. for first diffs. with respect to point XI
	ETAL	TCOEF	1/(ETA(K)-ETA(K-1)) coefs. for first diffs. with respect to point ETA
	ETAC	TCOEF	2/(ETA(K+1)-ETA(K-1)) coefs. for first diffs. with respect to point ETA
	ETAR	TCOEF	1/(ETA(K+1)-ETA(K)) coefs. for first diffs. with respect to point ETA
	COEU	TCOEF FORCE	-2/(H2+2*H1) ZT diff. coeffs. for using surface boundary
	COEL	TCOEF FORCE	2/(H1+2*H2) ZT diff. coeffs. for using surface boundary
	ZCVU	TCOEF	ZLVU+ZRVU ZT diff. coef. used to solve for vortex sheet at downstream boundary
	ZLVL	TCOEF	DZ1/(ZT(LWINGL)-ZT(LWINGL-1)) ZT diff. used to solve for vortex sheet at downstream

			boundary
	ZRVL	TCOEF	DZ1/(Z0-ZT(LWINGL)) ZT diff. coeff. used to solve for vortex sheet at downstream boundary
	ZCVL	TCOEF	ZLVL+ZRVL ZT diff. coeff. used to solve for vortex sheet at downstream boundary
	PDUM	IC SOLVE OUTP	PJUMPT(K) values of potential jump
	EDUM	SOLVE OUTP	ETA(K)
	XMIN		not used
	XMAX		not used
	YMAX		not used
	ZMAX		not used
	YMIN		not used
	ZMIN		not used
	ZLVU	TCOEF	DZ1/(ZT(LWINGU)-Z0) ZT diff. coeff. used to solve for vortex sheet at downstream boundary
	ZRVU	TCOEF	DZ1/(ZT(LWINGU+1)-ZT(LWINGU)) ZT diff. coeff. used to solve for vortex sheet at downstream boundary
EXTER	XIEX	SETUPX	(XINX(J)-X0)/CORDX transformed XINX coords. at mesh points
	ETAX	INPUT CRDGRD	ETA coordinate at mesh pts.
	ZTX	INPUT CRDGRD	ZT coordinate at mesh pts.
	XINX	INPUT	X mesh along centerline
	XILX	TCOEFX	1/(XIEX(J)-XIEX(J-1)) coeff. for 1st diff. with respect to point XIEX
	XICX	TCOEFX	2/(XIEX(J+1)-XIEX(J-1)) coeff. for 1st diff. with respect to point XIEX
	XIRX	TCOEFX	1/(XIEX(J+1)-XIEX(J)) coeff. for 1st diff. with respect to point XIEX
	ETACX	TCOEFX	2/(ETAX(K+1)-ETAX(K-1)) coeff. for 1st diff. with respect to point ETAX
	ETALX	TCOEFX	1/(ETAX(K)-ETAX(K-1)) coeff. for 1st diff. with respect to point ETAX

AD-A054 998 GRUMMAN AEROSPACE CORP BETHPAGE N Y F/G 20/4
AN AUTOMATED PROCEDURE FOR COMPUTING THE THREE-DIMENSIONAL TRAN--ETC(U)
FEB 78 W H MASON, D MACKENZIE, M STERN F33615-75-C-3073
UNCLASSIFIED AFFDL-TR-77-122-VOL-2 NL

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COMMON	VARIABLE	SOURCE	DESCRIPTION
	ETARX	TCOEFX	1/(ETAX(K+1)-ETAX(K-1)) coeff. for 1st diff. with respect to point ETAX
	XMINX		not used
	XMAXX		not used
	YMAXX		not used
	ZMAXX		not used
	YMINX		not used
	ZMINX		not used
	ZLVLX	TCOEFX	DZ1/(ZTX(LWINGLX)-ZTX(LWNGLX-1)) ZTX diff. coeff. used to solve for vortex sheet at downstream boundary
	ZCVLX	TCOEFX	ZLVLX+ZRVLX , ZTX diff. coeff. used to solve for vortex sheet at downstream boundary
	ZRVLX	TCOEFX	DZ1/(ZO-ZTX(LWINGLX)) ZTX diff. coeff. used to solve for vortex sheet at downstream boundary
	ZLVUX	TCOEFX	DZ1/(ZTX(LWINGUX)-ZO) ZTX diff. coeff. used to solve for vortex sheet at downstream boundary
	ZRVUX	TCOEFX	DZ1/(ZTX(LWINGUX+1)-ZTX(LWINGUX)) ZTX diff. coeff. used to solve for vortex sheet at downstream boundary
	ZCVUX	TCOEFX	ZLVUX+ZRVUX ZTX diff. coeff. used to solve for vortex sheet at downstream boundary
INDEX	JMAX	INPUT	number of streamwise (XI) mesh points
	KMAX	INPUT FINGRD	number of spanwise (ETA) mesh points
	LMAX	INPUT FINGRD	number of vertical (ZT) mesh points
	KTM1	SETUP	KTIP-1
	KTIP	INPUT FINGRD	first ETA mesh pt. beyond wing tip
	KTIP1	SETUP	KTIP+1
	JWLE	SETUP FORCE	index of XI point at wing root leading edge

COMMON	VARIABLE	SOURCE	DESCRIPTION
	JWTE	SETUP	index of XI mesh point at wing root trailing edge
	JLE	WINGCO FORCE	index of XI mesh point at wing leading edge
	JTE	SETUP	index of XI mesh point at wing trailing edge
	LWINGL	SETUP	LWINGU-1
	LWINGU	INPUT FINGRD	ZT mesh index of first pt. above wing plane
	JMAX1	SETUP	JMAX-1
	KMAX1	SETUP	KMAX-1
	LMAX1	SETUP	LMAX-1
	KROOT	INPUT GEOMB	index of ETA mesh point at wing/body juncture
	JP1	SOLVE OUTBOD	
INDEXX	JMAXX	INPUT	number of streamwise (XINX) mesh points
	KMAXX	INPUT CRDGRD	number of spanwise (ETAX) mesh points
	LMAXX	INPUT CRDGRD	number of vertical (ZTX) mesh points
	KTM1X	SETUPX CRDGRD	KTIPX-1
	KTIPX	INPUT CRDGRD	first ETAX mesh pt. beyond wing tip
	KTIP1X	SETUPX	KTIPX+1
	JLEX	SETUPX	index of XIEX mesh point at wing leading edge
	JTEX	SETUPX	index of XIEX mesh point at wing trailing edge
	LWNGUX	INPUT CRDGRD	ZTX mesh index of first pt. above wing plane
	LWNGLX	SETUPX	LWNGUX-1
	JMAXX1	SETUPX	JMAXX-1
	KMAXX1	SETUPX	KMAXX-1
	LMAXX1	SETUPX	LMAXX-1
	KROOTX	INPUT GEOBRX	index of ETA mesh point at wing/body juncture
	JP1X	SOLVEX	JP1

COMMON	VARIABLE	SOURCE	DESCRIPTION
FLAGS	IDISK	INPUT	T; start from old solution stored on unit 10
	ISAVE	INPUT SOLVE SOLVEX	ISAVE=T saves data on unit 11 for future restart
	IPLOT	INPUT	T; to save data on unit 12 for plotting purposes
	MSHINT	INPUT	T; initial conditions interpolated from old coarser mesh solution; IDISK must be true if MSHINT is true
	SOLV	INPUT	T; for complete execution; F: stop before solve loop is entered
	WBCPRT	INPUT	T; to output wing surface slopes
	BBCPRT	INPUT	T; to output body boundary information
	BODY	INPUT	T; for wing-body combination; F; skip input for body geometry and body mesh pts. (i.e. wing alone case)
	FCR	INPUT	T; for fully conservative method
	ISPAN	INPUT	T; for inclusion of extra spanwise terms in equation
	IFINR	INPUT	T: read in fine meshes
	ICRUDR	INPUT	F: read in coarse meshes
	EXTMSH	INPUT	T; to compute using embedded grid system; F; to compute with transformed interior mesh alone
	REMESH	INPUT	T; compute an initial solution with an initial coarse transformed mesh
	IMAPR	INPUT	T; read in XI=0 and XI=1 line mappings
	YAW	INPUT	T; yawed wing option
	IBUMP	INPUT	T; Murman bump option used
	IVISC	INPUT	T; full viscous-inviscid calculation performed F; only inviscid calculation done
	ITWIST	INPUT	T; separate twist table input
	IFOILT	INPUT	see input description
	IBODIN	INPUT	see input description
	AXISYM	INPUT	see input description
	AREA	INPUT	see input description
	IBLOUT	INPUT	see input description

COMMON	VARIABLE	SOURCE	DESCRIPTION
PARM	A1	TCOEF	1-(MACHNO)**2
	A2	TCOEF	(GAMMA+1)*.5*MACHNO**EMEXP(1)
	A3	TCOEF	A1
	A4	TCOEF	1-(GAMMA-1)*.5*MACHNO**2
	A5	TCOEF	(GAMMA-1)*MACHNO**2
	GAMMA	INPUT	specific heat ratio
	MACHNO	INPUT	free stream Mach number
	COE	TCOEF	-2, coefficient of potential in Cp calculation
	C2	TCOEF	1
	EMEXP	INPUT	EMEXP(1):Mach number exponent in nonlinear term; EMEXP(2):Mach number exponent in wing boundary condition
	CK1	TCOEF	A1/(fine mesh chord)**2
	CK2	TCOEF	A2/(fine mesh chord)**3
	CK3	TCOEF	A3
	CK4	TCOEF	-A4
	CK51	TCOEF	A5*CI = A5/(fine mesh chord)
	CK52	TCOEF	A5*.5*XIC(J)/(CORD(K+1) +CORD(K)); CORD = fine mesh chord
	CK1X	TCOEFX	A1/(coarse mesh chord)**2
	CK2X	TCOEFX	A2/(coarse mesh chord)**3
	BLDL	VISCFL	lower surface wing boundary condition
	WCOE	WINGCO	MACHNO**EMEXP(2)
RELAXP	MAXIT	INPUT	maximum number of iterations for current run
	MAXITN	INPUT	number of iterations on fine mesh
	MAXITX	INPUT	number of iterations on coarse mesh
	INCR	INPUT	print increment for fine mesh iterations
	INCRX	INPUT	print increment for coarse mesh iterations
	RTEST	INPUT	convergence criterion of max potential error
	RSUB	INPUT	subsonic relaxation parameter (1.8) for fine mesh
	RSUBX	INPUT	subsonic relaxation parameter for coarse mesh (1.8)
	RESIDJ	SOLVE	PJNEW(K)-PJUMP(K,J); potential jump error
	EPS	INPUT	coefficient of PXT in fine

COMMON	VARIABLE	SOURCE	DESCRIPTION
			mesh calculation
	EPSEX	INPUT	coefficient of PXT in coarse mesh calculation
	WIX	MAIN	1/RSUBX
	WI	MAIN	1/RSUB
	JRD	SOLVE	location in XI and XIEX meshes of largest residual
		SOLVEX	
		DBNDY	
		DBNDYX	
	KRD	SOLVE	location in ETA and ETAX meshes of largest residual
		SOLVEX	
		DBNDY	
		DBNDYX	
	LRD	SOLVE	location in ZT and ZTX meshes of largest residual
		SOLVEX	
		DBNDY	
		DBNDYX	
	BIGRL	SOLVE	ABSD; largest residual
		SOLVEX	
		DBNDY	
		DBNDYX	
	JE	SOLVE	J; location of largest error in XI and XIEX meshes
		SOLVEX	
		DBNDY	
		DBNDYX	
	KE	SOLVE	K; location of largest error in ETA and ETAX meshes
		SOLVEX	
		DBNDY	
		DBNDYX	
	LE	SOLVE	L; location of largest error in ZT and ZTX meshes
		SOLVEX	
		DBNDY	
		DBNDYX	
	ERROR	SOLVE	ARESID; largest error
		SOLVEX	
		DBNDY	
		DBNDYX	
	KOUNT	SOLVE	count of consecutive iterations on fine mesh
		SOLVEX	

COMMON	VARIABLE	SOURCE	DESCRIPTION
	NSUP	SOLVE	number of supersonic points in flow field
		SOLVEX	
	IPASS	MAIN	flag used in computing with REMESH = T option
WING	YROOT	INPUT	Y coordinate of root
	XLER	INPUT	X coordinate of leading edge at root
	XTER	INPUT	X coordinate of trailing edge at root
	YTIP	INPUT	Y coordinate of tip
	XLET	INPUT	X coordinate of leading edge at tip
	XTET	INPUT	X coordinate of trailing edge at tip
	NLES		number of segments input to describe the leading edge
	NLEI	INPUT	number of Y,X pairs defining leading edge segment
	YLEI,XLEI	INPUT	Y,X pairs defining the leading edge segment
	NTEI	INPUT	number of Y,X pairs defining the trailing edge segment
	YTEI,XTEI	INPUT	Y,X pairs defining the trailing edge segment
	CROOT	SETUP	XTER-XLER
	SSPAN	SETUP	YTIP-YROOT
	NPAN	INPUT	number of span stations at which airfoil ordinates are input
	YP	INPUT	fraction of semispan at which airfoils are defined
	THETP	INPUT	twist angle in degrees; leading edge up=YP positive
	NTWST	INPUT	
	YTWST	INPUT	
	INUX	INPUT SCALE	number of upper surface airfoil ordinates L.E. 90
	INLX	INPUT SCALE	number of lower surface airfoil ordinates L.E. 90
	XF	INPUT SCALE	
	ZF	INPUT SCALE	ZF(I,N)/CHRD
	KSMTHS	INPUT	number of times computed surface slopes are smoothed
	XMOM	INPUT	moment reference
	XLE	SETUP	x location of mesh wing leading

COMMON	VARIABLE	SOURCE	DESCRIPTION
			edge in fine mesh
	XLEW	SETUP	x location of actual wing leading edge
	CORD	SETUP	XTE(K)-XLE(K); mesh chord in fine mesh
	CORDW	SETUP	XTEW(K)-XLEW(K); actual wing chord
	CORDIN	SETUP	chord at input coordinate stations
	XTE	SETUP	x location of mesh wing trailing edge in fine mesh
	RFACT	INPUT	Regiels rule factor for modified slopes
	CMEAN	SETUP	mean chord of reference wing
	XTEW	SETUP	x location of actual wing trailing edge
	NS0	INPUT BEND	number of segments defining XI=0 line
	NS1	INPUT BEND	number of segments defining XI=1 line
	KX0	INPUT BEND	K index of outboard edge of XI=0 segment
	KX1	INPUT BEND	K index of outboard edge of XI=1 segment
	NX0	INPUT BEND	number of Y,X pairs defining XI=0 segment
	NX1	INPUT BEND	number of Y,X pairs defining XI=1 segment
	YX0,XX0	INPUT BEND	Y,X pairs defining XI = 0 segment
	YX1,XX1	INPUT BEND	Y,X pairs defining XI = 1 segment
	DXR0	INPUT BEND	DX/DY at inboard edge of XI = 0 segment
	DXR1	INPUT BENL	DX/DY at inboard edge of XI = 1 segment
	DXT0	INPUT BEND	DX/DY at outboard edge of XI = 0 segment
	DXT1	INPUT BEND	DX/DY at outboard edge of XI = 1 segment
	ALPHAW	INPUT	wing reference plane angle of attack in degrees
	NTIPLE		always input as 0

COMMON	VARIABLE	SOURCE	DESCRIPTION
	NTIPXI		always input as 0
	XLEWX	SETUPX	x location of wing leading edge in coarse mesh
	XTEWX	SETUPX	x location of wing trailing edge in coarse mesh
	CORDX	SETUP	mesh root chord
	XOR	SETUP	
	CAV	SETUP	.5*(CROOT+CTIP); average wing chord
	SREF	SETUP	reference wing area
	SWEEP	SETUP	leading edge sweep in degrees
	STRUE	SETUP	true wing planform area
	SXPOS	SETUP	exposed wing planform area
	THICK	INPUT	thickness scaling factor
	ZWNGWL	WINGCO	wing waterline
	KSWICH	WINGCO	airfoil clue; 0 = conventional 1 = supercritical
	XLEWP	SETUP	tangent of leading edge sweep
	XTEWP	SETUP	tangent of trailing edge sweep
BODV1	XNOSE	INPUT GEOMBR	X coordinate of body nose
	XTAIL	INPUT GEOMBR	X coordinate of body tail
	NBIN	INPUT	number of X,R pairs defining circular body
	XBIN,RBIN	INPUT	X,R pairs defining circular body
	NBODS	INPUT	number of segments input to define circular body
	JBUP	INPUT	first XI mesh pt. index of segment
	JBDN	INPUT	last XI mesh pt. index of segment
	JNOSE	MAIN INPUT GEOMBR	XI mesh pt. index of body nose
	JTAIL	MAIN INPUT GEOMBR	XI mesh point index of body tail
	ALPHAB	INPUT	body reference line angle of attack in degrees
	NBPTS	GEOMB	number of mesh pts. defining body cross section
	R	GEOMB	RS(NX)
	KBMX	INPUT GEOMB	array of indices of maximum ETA mesh pt. on body
	LMN	GEOMB	index of minimum ZT pt. on body

COMMON	VARIABLE	SOURCE	DESCRIPTION
	LMX	GEOMB	index of maximum ZT mesh pt. on body
	AFK	GEOMB	-BFK(K)-CFK(K); extrapolation coeff. for body surface
	BFK	GEOMB	DK/(DKP1*DKP2); extrapolation coeff. for body surface
	CFK	GEOMB	-DKP1/(DKP2*DK); extrapolation coeff. for body surface
	AFL	GEOMB	-BFL(I)-CFL(I); extrapolation coeff. for body surface
	BFL	GEOMB	DL/(DLP1*DLP2); extrapolation coeff. for body surface
	CFL	GEOMB	-DLP1/(DLP2*DL); extrapolation coeff. for body surface
	ABL	GEOMB	-BBL(I)-CBL(I); extrapolation coeff. for body surface
	BBL	GEOMB	-DL/(DLM1*DLM2); extrapolation coeff. for body surface
	CBL	GEOMB	DLM1/(DLM2*DL); extrapolation coeff. for body surface
	ACL	GEOMB	extrapolation coeff. for body surface
	BCL	GEOMB	extrapolation coeff. for body surface
		FORCE	
	CCL	GEOMB	extrapolation coeff. for body surface
	BTYPE	INPUT	type of body cross-section input, circular or rectangular
	XRBU	INPUT	X location of body slopes
	XRBL	INPUT	X location of body slopes
	DZRBU		upper body slopes
	DZRBL		lower body slopes
	NRBU	INPUT	number of upper body slopes
	NRBL	INPUT	number of lower body slopes
	YRB	INPUT	Y location of side of body
	ZRBU	INPUT	Z location of top of body
	ZRBL	INPUT	Z location of bottom of body
	KBMXX	INPUT	array of indices of maximum
		GEOBRX	ETAX mesh pt. on body
	JNOSEX	INPUT	index of XIEX mesh pt. at body nose
		GEOBRX	
	JTAILX	INPUT	JMAXX; index of XIEX mesh pt. at body tail
		GEOBRX	
	XNOSEX	GEOBRX	XINX(1)
	XTAILX	GEOBRX	XINX(JMAXX)
	YQB		

COMMON	VARIABLE	SOURCE	DESCRIPTION
BODV2	FX	GEOMB	FXS(NX)+AOFAB*FZ(N,j); slope
	FY	INPUT	-ETA(K)/RP; slope
		GEOMB	
		GEOMBR	
	FZ	GEOMB	-ZT(L)/RP; slope
	KBOD	GEOMB	K index of body pts. (input)
	LBU	GEOMB	LLBU; array of ZT indices on upper body surface
		GEOMBR	
	LBD	GEOMB	LLBL; array of ZT indices on lower body surface
		GEOMBR	
	NBPTSX	GEOBRX	NPTS; no. of coarse mesh pts. lying on body
	LBOD	GEOMB	L index of body pts. (input)
	LBUX	GEOBRX	LLBUX; array of ZTX indices on upper body surface
	LBDX	GEOBRX	LLBLX; array of ZTX indices on lower body surface
	FYX	GEOBRX	
	CPS		
BODV3	KBMAX	GEOMBR	KBS; index of maximum ETA mesh point on body
	KBMAXX	GEOBRX	KBS; index of maximum ETAX mesh point on body
	LLBL	GEOMBR	index of ZT mesh pt. on lower surface of rectangular body
	LLBU	GEOMBR	index of ZT mesh pt. on upper surface of rectangular body
	LLBLX	GEOBRX	index of ZTX mesh pt. on lower surface of rectangular body
	LLBUX	GEOBRX	index of ZTX mesh pt. on upper surface of rectangular body
	RBCU	INPUT	DXU(J); upper body slope in fine mesh
		GEOMBR	
		TOPBOD	
	RBCL	INPUT	DXL(J); lower body slope in fine mesh
		GEOMBR	
	RBCUX	GEOBRX	upper body slope in coarse mesh
	RBCLX	GEOBRX	lower body slope in coarse mesh
	DRBCU	GEOMBR	fine mesh diff. coeff. for body g. c.
	DRBCL	GEOMBR	fine mesh diff. coeff. for body g. c.

COMMON	VARIABLE	SOURCE	DESCRIPTION
	DRBCUX	GEOBRX	coarse mesh diff. coeff. for body g. c.
	DRBCLX	GEOBRX	coarse mesh diff. coeff. for body g. c.
	KBS		
	SALPH		
	SALPHX		
BODYBC	IBUD	INPUT	no. of pts. describing body body surface
	IBLD	INPUT	no. of pts. describing body lower surface
	IBSIDE	INPUT	no. of pts. describing body side surface
	ETABU	INPUT	y locations along upper surface of body cross-section
	ETABL	INPUT	y locations along lower surface of body cross-section
	ZBOD	INPUT	z locations along side of body cross-section
	NRBS	INPUT	no. of x locations of cross-sections
	XRBS	INPUT	x location of cross-section
JUMP	AZU	IC	extrap. coeff. for pot. jump at trailing edge
	AZL	IC	extrap. coeff. for pot. jump at trailing edge
	BZU	IC	extrap. coeff. for pot. jump at trailing edge
	BZL	IC	extrap. coeff. for pot. jump at trailing edge
	CZU	IC	extrap. coeff. for pot. jump at trailing edge
	CZL	IC	extrap. coeff. for pot. jump at trailing edge
	COFF	SOLVE	.5*SQRT(C2)*XLOAD/PI; circulation
	PJUMP	INPUT IC GCALC	potential jump in fine mesh
	PCOEF	GCALC	ETA coeffs. used in calculating PJUMP (for circular body only)
	KPINDX	GCALC	indices used in calculating PJUMP (circular body only)
	PJUMPX	INPUT WNGBDY BODBDY	potential jump in coarse mesh

COMMON	VARIABLE	SOURCE	DESCRIPTION
LABEL	TITLE	INPUT	the input case title
XYCOE	X	SETUP	physical X mesh as function of XI and ETA
	XIY	SETUP	derivative of XI with respect to Y
	XIX		derivative of XI with respect to X
	XIYJ	TCOEF	(XIY(K,J)+XIY(K,J+1))*.5 value of XIY between 2 mesh points in XI direction
	XX	SETUPX	physical X mesh as function of XIEX
	XIYK	TCOEF	(XIY(K,J)+XIY(K+1,J))*.5 value of XIY between 2 mesh points in ETA direction

LARGN is for storage of fine grid potential array and fine grid difference coefficients.

COMMON	VARIABLE	SOURCE	DESCRIPTION
LARGN	PF	IC FARBDY PHIBOD	fine grid potential array
	DJK1	TCOEF	.25*CI*XIC(J)*ETAC(K)
	DJK2	TCOEF	XIYJ(K,1)*CI*XIC(J)*XIL(J)
	DJK3	TCOEF	XIYJ(K,J)*CI*XIC(J)*XIR(J)
	DJK4	TCOEF	XIYJ(K,1)*.25*XIC(J)*ETAC(K)
	DJK5	TCOEF	XIYJ(K,J)*.25*XIC(J)*ETAC(K)
	DJK6	TCOEF	XIYJ(K,1)*XIYJ(K,1)* XIC(J)*XIL(J)
	DJK7	TCOEF	XIYJ(K,J)*XIYJ(K,J)*XIC(J) *XIR(J)
	DJK8	TCOEF	CM*XIYK(1,J)*XIC(J)*ETAC(K)*CI *.25
	DJK9	TCOEF	CP*XIYK(K,J)*XIC(J)*ETAC(K)*CI *.25
	DJK10	TCOEF	CP*XIYK(K,J)*XIC(J)*ETAC(K)*CI *.25
	DJK11	TCOEF	CP*CI*ETAC(K)*ETAR(K)

LCO is for storage of fine grid difference coefficients for the elliptic and hyperbolic PHI terms

COMMON	VARIABLE	SOURCE	DESCRIPTION
LCO	DE1	TCOEF	XIC(J)*XIL(J); elliptic coeff. of (PHI)xx term
	DE2	TCOEF	DE1(J)+DE3(J); elliptic coeff. of (PHI)xx term
	DE3	TCOEF	XIC(J)*XIR(J); elliptic coeff.

COMMON	VARIABLE	SOURCE	DESCRIPTION
			of (PHI)xx term
	DH1	TCOEF	XIC(J)*XI32; hyperbolic coeff. of (PHI)xx term
	DH2	TCOEF	DH1(J)+DH3(J); hyperbolic coeff. of (PHI)xx term
	DH3	TCOEF	XIC(J)*XIL(J); hyperbolic coeff. of (PHI)xx term
	DL1	TCOEF	ZC*ZL: coeff. of (PHI)zz term
	DL2	TCOEF	ZC*(ZL+ZR); coeff. of (PHI)zz term
	DL3	TCOEF	ZC*ZR; coeff. of (PHI)zz term

LCOX is for storage of the coarse grid difference coefficients for the elliptic and hyperbolic PHI terms, and special difference coefficients for the downstream boundary.

COMMON	VARIABLE	SOURCE	DESCRIPTION
LCOX	DE1X	TCOEFX	XICX(J)*XILX(J); elliptic coeff. of (PHI)xx term
	DE2X	TCOEFX	DE1X(J)+DE3X(J); elliptic coeff. of (PHI)xx term
	DE3X	TCOEFX	XICX(J)*XIRX(J); elliptic coeff. of (PHI)xx term
	DH1X	TCOEFX	XICX(J)*XILX(J-1); hyper. coeff. of (PHI)xx term
	DH2X	TCOEFX	DH1X(J)+DH3X(J); hyper. coeff. of (PHI)xx term
	DH3X	TCOEFX	XICX(J)*XILX(J); hyper. coeff. of (PHI)xx term
	DL1X	TCOEFX	ZC*ZL; coeff. of (PHI)zz term
	DL2X	TCOEFX	ZC*(ZL+ZR); coeff. of (PHI)zz term
	DL3X	TCOEFX	ZC*ZR; coeff. of (PHI)zz term
	DK1	TCOEF TCOEFX	C2*(CORD(K)+CORD(1))*.5*CC* ETAR(K)*ETAC(K) special ETA coeff. for downstream boundary
	DK2	TCOEF TCOEFX	DK1(K)+DK3(K) special ETA coeff. for downstream boundary
	DK3	TCOEF TCOEFX	C2*(CORD(K+1)+CORD(K))*.5*CC* ETAR(K)*ETAC(K) special ETA coeff. for downstream boundary

LARGX is for storage of the coarse grid potential array and coarse grid difference coefficients.

COMMON	VARIABLE	SOURCE	DESCRIPTION
LARGX	PC	IC WNGBDY	PCINT(J1,J2,J3,J4,K1,K2,L1,L2, DX1,DX2,DY,DZ)

COMMON	VARIABLE	SOURCE	DESCRIPTION
		BODBDY	
	DJK10X	TCOEFX	ETACX(K)*ETALX(K)
	DJK11X	TCOEFX	ETACX(K)*ETARX(K)
	DJK1X	TCOEFX	.25*CI*ETACX(K)*XICX(J)
MESHCO	JEX	MESHIN	*
	KEX	MESHIN	*
	LEX	MESHIN	*
	DXEX	MESHIN	*
	DYEX	MESHIN	*
	DZEX	MESHIN	*
			* stored results of searches for interpolation of PHI from coarse to fine mesh
	KIN	MESHIN	+
	JINK	MESHIN	+
	LIN	MESHIN	+
	DYIN	MESHIN	+
	DZIN	MESHIN	+
			+ stored results of searches for interpolation of PHI from fine to coarse mesh
	KINB	MESHIN	$
	DYINB	MESHIN	$
	LINB	MESHIN	$
	DZINB	MESHIN	$
	JINB		$
			$ stored results of searches for interpolation of PHI from fine to coarse mesh
	JINKM1	MESHIN	stored result of search for interpolation of PHI from fine to coarse mesh
	KEXB	MESHIN	KROOTX+1 &
	LEXB	MESHIN	&
	DYEXB	MESHIN	(ETA(KROOT)-ETAX(KROOTX))/ (ETAX(KROOTX+1)-ETAX(KROOTX)) &
	DZEXB	MESHIN	&
			& stored results of searches for interpolation of PHI from coarse to fine mesh at body surface
	JCDN	MESHIN	JEX(1,JMAX); index of XX at coarse/fine downstream interface
	JCUP	MESHIN	JEX(1,1)-1; index of XX at coarse/fine upstream interface
WINGBC	ZLWL	TCOEF	2/(H1*(H1+2*H2)) ZT diff. coeff. to lower wing

COMMON	VARIABLE	SOURCE	DESCRIPTION
			surface boundary
	ZRWU	TCOEF	2/(H2*(H2+2*H1)) ZT diff. coeff. to upper wing surface boundary
	TWIST	WINGCO	slope increment due to wing twist
	WBCL	WINGCO	WCOE*COEL*(TEMPL-AOFA) lower surface boundary conditions
	WBCU	WINGCO	WCOE*COEU*(TEMPU-AOFA) upper surface boundary conditions

OLD is for temporary storage of old mesh data for mesh interpolation (IDISK=T,MSHINT=T option or REMESH =T option.

COMMON	VARIABLE	SOURCE	DESCRIPTION
OLD	XIO	IC STORE	old XI array
	ETAO	IC STORE	old ETA array
	ZTO	IC STORE	old ZT array
	PJUMPO	IC STORE	old trailing edge potential jump
	LBUO	IC STORE	old LBU array
	LBDO	IC STORE	old LBD array
	PJUMPT	IC INTERP	trailing edge potential jump interpolated onto new mesh
	KBMXO	STORE	old KBMX array
	JMO	IC STORE	old values of JMAX
	KMO	IC STORE	old values of KMAX
	LMO	IC STORE	old values of LMAX
	JTAILO	IC STORE	old values of JTAIL
	JNOSEO	IC STORE	old values of JNOSE
	LWUO	IC STORE	old values of LWINGU
	FINE	IC	logical clue for INTERP

SCRACH is for temporary storage of data arrays used in SOLVE and SOLVEX.

COMMON	VARIABLE	SOURCE	DESCRIPTION
SCRACH	MU	SOLVE SOLVEX	shock pt operator; MU=0 at subsonic pts, MU=1 at supersonic pts.
	POLD	SOLVE SOLVEX	old values of potential at current and two upstream calculation planes
	VC2	SOLVE SOLVEX SOLVEX	contribution of spanwise term to coeff. for (PHI)xx
	VC	SOLVE SOLVEX	coefficient of CSD PHI term; VC>0 at subsonic pts; VC<0 at supersonic pts.

EPLT is for the storage of the errors and residuals for subroutine ERPLOT.

COMMON	VARIABLE	SOURCE	DESCRIPTION
EPLT	CEF	SOLVE	offset for fine grid error plot
	ERROF	SOLVE	initial fine grid error
	ERRF	SOLVE	CEF+ALOG10(error)
	CRF	SOLVE	offset for fine grid residual plot
	RSDOF	SOLVE	initial fine grid residual
	RSDF	SOLVE	CRF+ALOG10(residual)
	CEX	SOLVEX	offset for coarse grid error plot
	ERROX	SOLVEX	initial coarse grid error
	ERRX	SOLVEX	CEX+ALOG10(error)
	CRX	SOLVEX	offset for coarse residual plot
	RSDOX	SOLVEX	initial coarse grid residual
	RSDX	SOLVEX	CRX+ALOG10(residual)
LOCAL	LSONL	OUTP	index of vertical location of sonic line on lower surface
	LSONU	OUTP	index of vertical location of sonic line on upper surface
	XOC	OUTP	local PSI
VSCINP	IVSMAX	INPUT	maximum allowed number of viscous iterations
	ISTOP	VISCFL	
	IVITER	VISCFL	number of current viscous iteration
	IVCON	INPUT	convergence criterion clue; 1 = convergence on pressure change 2 = convergence on lift change
	EPSVIS	INPUT	viscous convergence limit

COMMON	VARIABLE	SOURCE	DESCRIPTION
	RE	INPUT	Reynold's no.
	IOUTP	INPUT	output clue; 0 = normal output 1 = boundary layer output 2 = full profile output
	ISTEPO	INPUT	no. of b. l. steps between profile output (used only when IOUTP = 2)
	ITRANS	INPUT	-4; transition clue for strip boundary layer
	XTRNT	INPUT	upper surface transition location; x/c
	XTRNB	INPUT	lower surface transition location; x/c
	IUNIT	INPUT	output device no.
	KSMTHX	INPUT	smoothing parameter
	K2SMTH	INPUT	smoothing parameter
	KENDS	INPUT	smoothing parameter
	CHISWP	INPUT	chord position at which effective sweep angle is calculated
	KWRITE	IC	saved solution clue; 0 = inviscid, 1 = viscous
	LWRITE	INPUT	viscous output 1 = abbreviated output
CPCAL	AVCHGU	CPCALC	average change of CP along each span station for upper surface
	AVCHGL	CPCALC	average change of CP along each span station for lower surface
	DCPMXU	CPCALC	max CP change for upper surface
	DCPMXL	CPCALC	max CP change for lower surface
	CPNL	CPCALC	new CP for max change at lower surface
	CPOL	CPCALC	old CP at max change at upper surface
	JMXL	CPCALC	location of max change on lower surface
	CPNU	CPCALC	new CP at max change at upper surface
	CPOU	CPCALC	old CP at max change at lower surface
	EPS1	CPCALC	total CP change on upper surface for convergence check if IVCON = 1

COMMON	VARIABLE	SOURCE	DESCRIPTION
	EPS2	CPCALC	total CP change cn lower surface for convergence check if IVCON = 1
	CMAXDT	CPCALC	
	CMAXDB	CPCALC	
	CPTBAR	CPCALC	average of the absolute value of CP on top surface
	SONPU	CPCALC	last acceleration past sonic on upper surface
	SONPL	CPCALC	last acceleration past sonic on lower surface
	MACHUP	CPCALC	no. of accelerations past sonic on upper surface
	MACHDN	CPCALC	no. of accelerations past sonic on lower surface
	SHKPU	CPCALC	no. of shock points on upper surface
	SHKPB	CPCALC	no. of shock points on lower surface
	JMXU	CPCALC	location of max change on upper surface
	CPU	CPCALC	pressure distribution on upper surface
	CPL	CPCALC	pressure distribution on lower surface
	EMSQ	CPCALC	MACHNO**2
	NGRIDS	CPCALC	1
	CPBBAR	CPCALC	average of the absolute value of CP on the lower surface
VITERP	XOUTOD	SAVSOL IC	values of XOUT from old solution
	ETAOLD	SAVSOL IC	values of ETA from old solution
	DXLSTU	VISCFL IC	upper surface deltastar values
	DXLSTL	VISCFL IC	lower surface deltastar values
	KTMOLF		
	NXOLD	SAVSOL IC	old values of NX
	K7OLD	SAVSOL IC	value of K7X from old solution
	K8OLD	SAVSOL IC	value of K8X from old solution
SZT	XOUT		X/C values for which output to be calculated

COMMON	VARIABLE	SOURCE	DESCRIPTION
	NX	VISCPL	JWTE-JWLE+1; no. of chordwise points at current span station
	SEPXL		lower surface separation location
	K8BL	VISCPL	
	ZSLPOG		
	ZSLPTE		
	XPILOG		
	SEPMIN	VISCPL	minimum lower surface separation location
	DDDSL	VISCPL	modified lower surface deltastar slope from Bavitz treatment
		BAVITZ	
YAWOPT	K1X	SETUP	1; if YAW = T, K1X = 2
	K2X	SETUP	KMAX; if YAW = T, K2X = 5
	K3X	SETUP	1; if YAW = T, K3X = 3
	K4X	SETUP	KMAX-1; if YAW = T, K4X = 4
	K5X	SETUP	1; if YAW = T, K5X = 2
	K6X	SETUP	KTIP; if YAW = T, K6X = 5
	K7X	SETUP	KROOT; index of span station at centerline or, if BODY = T, first span station outside body; if YAW = T, K7X = 3
	K8X	SETUP	KTM1; if YAW = T, K8X = 4
	KPIX	SETUP	2; if YAW = T, KPIX = 4
	KMIX	SETUP	2
VISCOM	DDSTL	SLOPY	lower surface deltastar slopes interpolated to viscous x/c's
	DDSTU	SLOPY	upper surface deltastar slopes interpolated to viscous x/c's
	SCFT	VISCPL	local upper surface skin friction
	SCFB	VISCPL	local lower surface skin friction
	CFFKL	VISCPL	integrated lower surface viscous drag
	CFFKU	VISCPL	integrated upper surface viscous drag
	DDDSTU	VISCPL	upper surface deltastar slopes
	DDDSTL	VISCPL	lower surface deltastar slopes
	CPUK1	VISCPL	upper surface CP at point KI,J1 (for convergence history)
	CPLK1	VISCPL	lower surface CP at point KI,J1 (for convergence history)
	CPUK2	VISCPL	upper surface CP at point KO,J1

COMMON	VARIABLE	SOURCE	DESCRIPTION
			(for convergence history)
	CPLK2	VISCFL	lower surface CP at point KO,J1 (for convergence history)
	DELUK1	VISCFL	upper surface deltastar at point KI,J1 (for convergence history)
	DELLK1	VISCFL	lower surface deltastar at point KI,J1 (for convergence history)
	DELUK2	VISCFL	upper surface deltastar at point KO,J1 (for convergence history)
	DELLK2	VISCFL	lower surface deltastar at point KO,J1 (for convergence history)
	CLGG	VISCFL	lift coefficient (for convergence history)
	EPS1X	VISCFL	convergence parameter (for convergence history)
	EPS2X	VISCFL	convergence parameter (for convergence history)
	VOTHET	VISCFL	2-D momentum thickness
	ITEX	VISCFL	no. of inviscid iterations completed between last viscous iteration and present viscous iteration (for convergence history)
	CPIU	VISCFL	upper surface CP at span station K for conversion to viscous x/c's
	CPVU	SLOPY	CP's at viscous x/c's
	ETAK	VISCFL	ETA(K)
	CPIL	VISCFL	lower surface CP at span station K for conversion to viscous x/c's
	CPVL	SLOPY	CP's at viscous x/c's
	CPVLP	SLOPY	(not used)
	SBRAL	VISCFL	lower surface x/c's used in boundary layer calculation
	DELSL	VISCFL	lower surface deltastar (from STRIPK)
	CFVL	VISCFL	lower surface skin friction in chordwise direction
	CFVU	VISCFL	upper surface skin friction in chordwise direction
	DELSTU	SLOPY	upper surface deltastar interpolated to viscous x/c's
	CFZL	VISCFL	lower surface skin friction in spanwise direction
	CFZU	VISCFL	upper surface skin friction in spanwise direction
	DELSTL	SLOPY	lower surface deltastars interpolated to viscous x/c's

COMMON	VARIABLE	SOURCE	DESCRIPTION
	CWU	CPCALC	upper surface diff. coeff. for extrapolation of CP's to wing surface
	CWL	CPCALC	lower surface diff. coeff. for extrapolation of CP's to wing surface
	PU	CPCALC	pressure at mesh points above wing; for extrapolation to wing surface
	PL	CPCALC	pressure at mesh points below wing; for extrapolation to wing surface
	DELSU	VISCFL	upper surface deltastars (from STRIPK)
	SBRAU	VISCFL	upper surface x/c's used in boundary layer calculation
	CPVUP	SLOPY	(not used)
LOCAL2	XCBLX	VISCFL	x/c's for viscous calculation
	NNX	VISCFL	local value of NX for input to SLOPY
	NNXX	VISCFL	41; no. of x/c's for viscous CP's for input to SLOPY
	DELPTE	VISCFL	potential jump at trailing edge
	XSEPU	VISCFL	upper surface separation location (for iteration summary)
	XSEPL	VISCFL	lower surface separation location (for iteration summary)
	WBCU1	VISCFL	local wing boundary condition for smoothing
VSFCOM	RELBL	INPUT	fine mesh relaxation factor for modification of slope boundary conditions
	EXTNDU	INPUT	x/c beyond which boundary layer slope is extrapolated on upper surface
	EXTNDL	INPUT	x/c beyond which boundary layer slope is extrapolated on lower surface; if foil is super-critical, no extrapolation is necessary
	AFCBL1	INPUT	inviscid-viscous boundary layer interaction parameter
	AFCBL2	INPUT	inviscid-viscous boundary layer interaction parameter
	KI	INPUT	inboard span station used for

COMMON	VARIABLE	SOURCE	DESCRIPTION
			convergence history
	KO	VISCPL	outboard span station used for convergence history
WINGX	WBCUOR	WINGCO	original upper surface boundary conditions
	WBCLOR	WINGCO	original lower surface boundary conditions
THRED	XLAM	VBRAD	cos(arctan(We/Ue))
EXTEND	XCMAX	VBRAD BLLAM	maximum value of x/c used for boundary layer calculation
	LASTI	VBRAD BLLAM	number of x/c's used for boundary layer calculation
REDUC	UFUT	VBRAD REDUCX	future velocity profile
	TFUT	VBRAD REDUCX	future shear stress profile
	WFUT	VBRAD REDUCX	local r(Gamma-1) Machno**2/UFUT
	TANAFU	REDUCX	tangent of alpha, angle of growth of characteristics
	TANBFU	REDUCX	tangent of beta, angle of growth of characteristics
	V	VBRAD REDUCX	vertical velocity profile
	I61	VBRAD REDUCX	no. of output x/c's + 1
	RK	VBRAD	SQRT(RK2)
	RK2	VBRAD	TETON*XMNSQ
	RK3	VBRAD	AY*XMNSQ/RK
VTRAN2	DELUP	VYTRANS	(not used)
	DELDN	VTRANS	(not used)
	DU	SLOPY	inboard upper surface deltastars interpolated to new NX
	DL	SLOPY	inboard lower surface deltastars interpolated to new NX
	DDU	SLOPY	dummy variable
	DDL	SLOPY	dummy variable
	XOUT	VTRANS	values of x/c for output
	DSLU	VTRANS	upper surface deltastars interpolated to new grid

COMMON	VARIABLE	SOURCE	DESCRIPTION
	DSLL	VTRANS	lower surface deltastars interpolated to new grid
	DU1	SLOPY	outboard upper surface deltastars interpolated to new NX
	DL1	SLOPY	outboard lower surface deltastars interpolated to new NX
	DDDSUI	VTRANS	upper surface deltastar slopes at inboard span station used for interpolation to new grid
	DDDSLI	VTRANS	lower surface deltastar slopes at inboard span station used for interpolation to new grid
	DDDSUO	VTRANS	upper surface deltastar slopes at outboard span station used for interpolation to new grid
	DDDSLO	VTRANS	lower surface deltastar slopes at outboard span station used for interpolation to new grid
	XOUTO1	VTRANS	old values of XOUT at outboard span station
	CPUI	VTRANS	inboard upper surface CP's from old solution
	CPLI	VTRANS	inboard lower surface CP's from old solution
	CPUO	VTRANS	outboard upper surface CP's from old solution
	CPLO	VTRANS	outboard lower surface CP's from old solution
	CPUIX	SLOPY	inboard upper surface CP's interpolated to new NX
	CPLIX	SLOPY	inboard lower surface CP's interpolated to new NX
	CPUOX	SLOPY	outboard upper surface CP's interpolated to new NX
	CPLOX	SLOPY	outboard lower surface CP's interpolated to new NX
	NX	VTRANS	number of x/c's at span station for new grid
	NXOLD1	VTRANS	number of x/c's at span outboard station for old grid
SZC	SZT		(not used)
	PILKLU		(not used)
	ICARD		(not used)
BAVCOM	CPL2	BAVITZ	local lower surface CP's
	DELSTL	BAVITZ	local lower surface deltastars

COMMON	VARIABLE	SOURCE	DESCRIPTION
	XSEP	BAVITZ	
	XSEP	BAVITZ	x/c's used for Bavitz treatment
	YSEP	SLOPY	lower surface deltastars interpolated to XSEP
	DST	BAVITZ	(not used)
	ST	BAVITZ	(not used)
ISOGM	XRANGE	GRAPH3	XMAX-XORG
	YBASE	GRAPH3	ETA(KROOT)
	YTREL	GRAPH3	YTIP-YBASE
	XINCH	GRAPH3	(6/YTREL)*XRANGE
	XORG	GRAPH3	XLEI(1,1)
FORCES	CL	SPNPLT	0
	CD	SPNPLT	0
	CMC2	SPNPLT	0
	CCBAR	SPNPLT	DCB/DETA*(1-ETA(KTM1-1)) *CCBAR(KTM1)
NSBL	XOUTA	WINGCO BLOUT	streamwise fraction of local chord
	ZOCU	WINGCO BLOUT	airfoil upper surface ordinate, fraction of local chord
	ZOCL	WINGCO BLOUT	airfoil lower surface ordinate, fraction of local chord
	CPU	OUTP BLOUT	upper surface pressure coefficient
	CPL	OUTP BLOUT	lower surface pressure coefficient
	ZLE	WINGCO	FLIN(ZLER,ZLET,Y,YR,YT)
BODV4	XUCL	INPUT	x location for body upper centerline (input)
	ZUCL	INPUT	body upper centerline
	XLCL	INPUT	x location for body lower centerline (input)
	ZLCL	INPUT	body lower centerline
	XZMHB	INPUT	x location of z max half-breadth
	ZMHB	INPUT	z max half-breadth
	XYMHB	INPUT	x location of y max half-breadth
	YMHB	INPUT	y max half-breadth
	NUCL	INPUT	no. of upper centerline locations input
	NLCL	INPUT	no. of lower centerline locations input
	MHBZ	INPUT	no. of z max half-breadths

COMMON	VARIABLE	SOURCE	DESCRIPTION
			input
	MHBY	INPUT	no. of y max half-breadths input
	ZUCLI	DATTRN	ZUCL interpolated to x's (fine grid in QUIK, coarse grid in QUIKX)
	ZUCLIP	DATTRN	slope of ZUCLI
	ZLCLI	DATTRN	ZLCL interpolated to x's
	ZLCLIP	DATTRN	slope of ZLCLI
	ZMHBI	DATTRN	ZMHB interpolated to x's
	ZMHBIP	DATTRN	ZMHBI slope of ZMHBI
	YMHBI	DATTRN	YMHB interpolated to x's
	YMHBIP	DATTRN	YMHBI interpolated to x's
MESHX	DXL	INPUT	XI mesh spacing at leading edge (fine mesh)
	DXT	INPUT	XI mesh spacing at trailing edge (fine mesh)
	DXMX	INPUT	max XI mesh spacing on wing (fine mesh)
	NF	INPUT	no. of grid lines upstream of XI=0.
	NB	INPUT	no. of grid lines downstream of XI=1.
	XDIST	INPUT	overall length of XI mesh
	XLG	INPUT	upstream extent of XI mesh
	DXLI	INPUT	XI mesh spacing at leading edge (initial mesh)
	DXTI	INPUT	XI mesh spacing at trailing edge (initial mesh)
	DXMXI	INPUT	max XI mesh spacing on wing (initial mesh)
	NFI	INPUT	no. of grid lines upstream of XI = 0. (initial mesh)
	IOUT1	INPUT	=0., no general mesh generation output =1., general mesh generation output
	IOUT2	INPUT	=0., no detailed mesh generation output =1., detailed mesh generation output
VELOC	UMK	SOLVE	negative of (PHI)xx coeff. (A2*(PHI)x-A1)
	V	SOLVE	spanwise velocity component in y direction
	FMU	SOLVE	value of MU in the wing plane

COMMON	VARIABLE	SOURCE	DESCRIPTION
MURCOM	F	INPUT	relaxation factor for Murman bump
	SHIFT	INPUT	percent chord shift in shock location
	MBSTRT	INPUT	no. of interior mesh iterations before start of Murman bump
	MBPRNT	INPUT	no. of interior mesh iterations between additional Murman bump printout; =0., no printout
BLCOM	IT	INPUT	max no. of iters. allowed at each row
	IOITER	INPUT	output of iteration history; = 0., no output = 1., full output
	IOPRF	INPUT	output of velocity profiles at each station = 0., no output = 1., full output
	IPUNCH	INPUT	= 0., do not punch output for plotting; = 1., punch output on unit 7
	KSMTH	INPUT	no. of smoothings of input pressure distribution
	CONV	INPUT	convergence criterion
	LTRN	BLOUT	grid index for transition
	SCALE	INPUT	reference length scale, ft.
	PRES	INPUT	static pressure, PSI
	TEMP	INPUT	static temperature, deg. R
	IBOUT	INPUT	output unit = 13
MUREXT	W	MURMAN	jump in vertical velocity at shock foot
	XOLD	MURMAN	old shock location in the wing plane
YAW1	T	SETUP	lift spreading factor fine grid
	T2	SETUP	farfield expression for potential - fine grid
YAW2	T	SETUP	lift spreading factor crude grid
	T2	SETUP	farfield expression for potential - crude grid
LEV1X	DXU		*
	DXL		*

COMMON	VARIABLE	SOURCE	DESCRIPTION
	XDUM		*
	XDUM2		*
	XDUM3		*
	XDUM4		*
	XDUM5		*
	XDUM6		*
			* dummy variables used for equivalencing
SAVES	NXO	IC	values of NX from old solution
	XOUTO	IC	values of XOUT from old solution
PARRY	P	SOLVE	j - plane potential array this array only appears in the AMES CDC version of the program
SKINFR	CFVISC	VISCFL	total viscous drag
	CFTU	VISCFL	upper surface skin friction
	CFTL	VISCFL	lower surface skin friction
CPOD	CPODU	CPCALC	upper surface CP from previous boundary layer iteration
	CPODL	CPCALC	lower surface CP from previous boundary layer iteration

4. TAPE/DISK UNITS

Because the program keeps most of the information in core at all times, there is relatively little use of tape and disk units. However, there are several units that are employed in addition to the standard READ from unit 5 and WRITE on unit 6. These devices are:

UNIT	USE
10	When using a previously saved solution as the initial guess for a new solution, the starting solution is read into the program from Unit 10.
11	Solutions are saved (when requested) on Unit 11.
12	This unit is for purely internal use, in order to carry out the mesh interpolation of the potential when changing from one mesh to another. Unit 12 is also used to save data for plotting the results in the CDC version.
13	This is the unit that is used to output the data set for the operation of the Nash/Scruggs boundary layer program in a subsequent step.
14	This unit can be used to save the detailed boundary layer output in case these details are of interest.

NOTE: Some of the output on these units is formatted rather than unformatted so that data saved on CDC equipment can be used readily on IBM systems.

5. SUBROUTINES

PROGRAM MAIN

PURPOSE: control program for the calculation of viscous transonic flow about wing-body combinations at Mach numbers less than one.

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION:
ERPLOT	for print plot of error and residual
IC	for initializing
INPUT	to obtain input data
MESHIN	for coarse-fine mesh interpolation setup
OUTBOD	for data output of circular body surface CP's
OUTP	for data output of wing surface CP's
SAVSOL	for saving the solution if ISAVE=T
SETUP	for geometry setup with respect to fine mesh
SETUPX	for geometry setup with respect to coarse mesh
SOLVE	for relaxation on fine mesh
SOLVEX	for relaxation on coarse mesh
STORE	for data output and cataloging when using REMESH = T option
TCOEF	for difference coefficient setup on fine mesh
TCOEFX	for difference coefficient setup on coarse mesh
WINGCO	for wing boundary condition calculation
TOPBOD	for body boundary condition when wing is top of body
VISCFL	for computing the viscous effects

DATA TO COMMON:

COMMON	VARIABLE
RELAXP	IPASS
	WI
	WIX

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION

ISKIP	controls heading of the iteration history
ITERC	crude grid iteration counter
ITERF	fine grid iteration counter

READ STATEMENTS: none

WRITE STATEMENTS:

RESIDJ(K)

SUBROUTINE INPUT

PURPOSE: reads and writes input data

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED: none

DATA TO COMMON:

*NOTE: the variables of the control parameters for code options, the flight conditions, the planform specifications, the airfoil specifications, the body specifications and the mesh and mapping are described in INPUT PROCEDURE

COMMON	VARIABLE
INTER	ETA
	XIN
	YMAX
	YMIN
	XMAX
	XMIN
	ZMAX
	ZMIN
	ZT
EXTER	ETAX
	XINX
	XMAXX
	XMINX
	YMAXX
	YMINX
	ZMAXX
	ZMINX
	ZTX
INDEX	JMAX
	KMAX
	KROOT
	KTIP
	LMAX
	LWINGU
INDEXX	JMAXX
	KMAXX

	KROOTX
	KTIPX
	LMAXX
	LWNGUX
FLAGS	XMRD
	XMRDX
	YMRD
	YMRDX
	ZMRD
	ZMRDX
RELAXP	EPSEX
	INCR
	INCRX
	MAXIT
	MAXITN
	MAXITX
WING	DXLER
	DXTER
	DXLET
	DXTET
	DXR1
	DXTO
	DXT1
	INL
	INU
	KSMTHS
	KXO
	KX1
	NLEI
	NLES
	NPAN
	NSO
	NS1
	NTEI
	NTES
	NTIPLE
	NTIPXI
	NXO
	NX1
	XTEI
	XXO
	XX1
	XLEI
	YTEI
	YXO
	YX1
BODV1	DZRBL
	DZRBU
	BTYPE

DATA TO COMMON(cont.)

	JBDN
	JBUP
	JNOSE
	JNOSEX
	JTAIL
	JTAILX
	KBMX
	KBMXX
	NBIN
	NBODS
	NBPTS
	NRBL
	NRBU
	XBIN
	XNOSE
	XTAIL
	YRB
BODV2	KBOD
	LBOD
BODV4	XUCL
	ZUCL
	XLCL
	ZLCL
	XZMHB
	ZMHB
	XYMHB
	YMHB
	NUCL
	NLCL
	MHBZ
	MHBY
JUMP	PJUMP
	PJUMPX
LABEL	TITLE
VSFCOM	AFCBL1
	AFCBL2
	EXTNDL
	EXTNDU
	KI
	RELBL
VSCINP	IOUTP
	ISTEPO
	ITRANS
	IVCON
	IVSMAX

READ STATEMENTS:

TITLE, BTITLE, BTYPE, ZRBU, ZRBL, YRB, NRBU, XRBU(I), IBUD, ETABU(I), RBCU(20+K,J), NRBL, XRBL(I), IBLD, ETABL(I), RBCL(20+K,J), NRBS, XRBS(I), IBSIDE, ZBOD(I), FY(20+L,J), XNOSE, XTAIL, NBODS, NBIN(N), JBUP(N), JBDN(N), XBIN(N,I), RBIN(N,I), PTITLE, YROOT, XLER, XTER, YTIP, XLET, XTET, XMOM, XNLE, YLEI(N), XLEI(N), XNTE, YTEI(N), XTEI(N), ATITLE, JIN, NTWST, NPAN, INU, INL, KSMTHS, XP(N), THETP(N), XINU(I), XINL(I), ISAME, ZUP(I), ZLP(I), XNPAN, XKSMTH, YP(N), XNWSEC, ZSYM, FNU, FNL, XF(I,N), ZF(I,N), XF(J,N), ZF(J,N), YTWST(I), THETP(I), TITLEM, JMAX, KMAX, LMAX, KTIP, LWINGU, XIN(J), ETA(K), ZT(L), NSO, KXO(N), NXO(N), YXO(N,I), XXO(N,I), DXRO(N), DXTO(N), NS1, KX1(N), NX1(N), YX1(N,I), XX1(N,I), DXR1(N), DXT1(N), JMAXX, KMAXX, LMAXX, KTIPX, LWNGUX, XINX(J), ETAX(K), ZTX(L)

WRITE STATEMENTS:

TITLE, MAXIT, INCR, IDISK, MSHINT, ISAVE, IPLOT, SOLV, WBCPRT, BBCPRT, BODY, FCR, ISPAN, EXTMSH, REMESH, YAW, MACHNO, ALPHAW, ALPHAB, GAMMA, RSUB, RTEST, EPS, RFACT, EMEXP(I), BTITLE, ZRBU, ZRBL, YRB, NRBU, XRBU(I), IBUD, ETABU(I), RBCU(20+K,J), NRBL, XRBL(I), IBLD, ETABL(I), RBCL(20+K,J), NRBS, XRBS(I), IBSIDE, ZBOD(I), FY(20+L,J), XNOSE, XTAIL, NBODS, NBIN(N), JBUP(N), JBDN(N), XBIN(N,I), RBIN(N,I), PTITLE, YROOT, XLER, XTER, YTIP, XLET, XTET, XMOM, NLEI, N, YLEI(N), XLEI(N), NTEI, YTEI(N), XTEI(N), ATITLE, JIN, NTWST, NPAN, INU, INL, KSMTHS, YP(I), THETP(I), XINU(I), XINL(I), I, YP(N), ZUP(I), ZLP(I), XF(I,N), ZF(I,N), XF(J,N), ZF(J,N), YTWST(I), TITLEM, JMAX, KMAX, LMAX, KTIP, LWINGU, XIN(J), ETA(K), ZT(L), NSO(N), KXO(N), NXO(N), YXO(N,I), XXO(N,I), DXRO(N), DXTO(N), NS1, KX1(N), NX1(N), YX1(N,I), XX1(N,I), DXR1(N), DXT1(N), JMAXX, LMAXX, KMAXX, KTIPX, LWNGUX, XINX(J), ETAX(K), ZTX(L)

SUBROUTINE SETUP

PURPOSE: computes planform parameters and fine grid, and transforms geometry and fine grid.

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
BEND	to define reference length for computational plane
GEOMBR	to compute body slopes (rectangular body)
GEOMB	to compute body slopes (circular body)
FINGRD	to calculate fine grid if not read in
SPLN1	setup of spline fit
SPLN1X	spline fit routine to compute mesh and wing leading and trailing edges
FLIN	statement function for linear interpolation

DATA TO COMMON:

COMMON	VARIABLE
INTER	XI
	XIN
INDEX	JMAX1
	KMAX1
	LMAX1
	LWINGL
	KTM1
	JWLE
	JWTE
	JTE
	KTIP1
WING	CROOT
	SSPAN
	CAV
	CMEAN
	XOR
	CORDX
	XLEW
	XLE
	XTEW

	XTE
	CORDW
	CORDIN
	CORD
XYCOE	XIY
	X
YAWOPT	K1X
	K2X
	K3X
	K4X
	K5X
	K6X
	K7X
	K8X
YAW1	T
	T2

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
AFACT1	**exponential damping in lift spreading, if desired**
AFACT2	**degree of lift spreading desired**
CMAC	mean aerodynamic chord of true planform
CTIP	XTET-XLET , tip chord
AR	aspect ratio based on reference wing
ARTRUE	aspect ratio of actual planform
DX	1st difference of computational XI grid
DY	1st difference of computational Y grid
DZ	1st difference of computational Z grid
D2X	2nd difference of computational XI grid
D2Y	2nd difference of computational Y grid
D2Z	2nd difference of computational Z grid
MONX	x mesh monotinicity check klue
MONY	y mesh monotinicity check klue
MONZ	z mesh monotinicity check klue
NMAX	MAXO(JMAX,KMAX,LMAX)
OUTX1	X grid for output
OUTETA	ETA grid for output
OUTZT	Z grid for output
J1	JLE(K)
J2	JTE(K)
SWPLE	(XLET-XLER)/SSPAN
SWPTE	(XTET-XTER)/SSPAN
SWPLED	leading edge sweep in degrees
SWPTED	trailing edge sweep in degrees

SREF	CAV*SSPAN, wing reference area
STRUE	true area of actual input planform
SXPOS	wing area of the exposed planform
TR	CTIP/CROOT, reference wing taper ratio
SLOPE	local variable to define slope of leading edge and mapping
YB	local definition of l.e. and t.e.
XB	local definition of l.e. and t.e.
YTEMP	local slopes for planform and mapping
XTEMP	local slopes for planform and mapping
XLEC	(X(K,J1)-XLEW(K))/CORDW(K)
XTEC	(X(K,J2)-XLEW(K))/CORDW(K)
XLEP	located in equivalence statement in PARM, leading edge slope
XTEP	located in equivalence statement in PARM, trailing edge slope
CORDP	located in equivalence statement in PARM, rate of change of chord with span
XLEMAC	distance to the leading edge of the mac

READ STATEMENTS: none

WRITE STATEMENTS:

N, OUTX1, OUTETA, OUTZT, DX, DY, DZ, D2X, D2Y, D2Z, SWPLE, SWPTE, CROOT, CTIP, S, AR, TR, CMEAN, CAV, K, ETA(K), XLE(K), XTE(K), XLEP(K), XTEP(K), JLE(K), JTE(K), XLEW(K), CORDW(K), XLEC, XTEC

SUBROUTINE SETUPX

PURPOSE: computes rectangular coarse exterior grid and geometry.

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
CRDGRD	to calculate crude ETA and ZT grids if not read in.
GEOBRX	to compute body slopes for crude grid
XC2	to calculate crude XIN grid if not read in
FLIN	statement function

DATA TO COMMON:

COMMON	VARIABLE
EXTER	XIEX
INDEXX	JMAXX1
	KMAXX1
	LMAXX1
	LWNGLX
	KTM1X
	KTIP1X
	JTEX(K)
	JLEX(K)
WING	XLEWX(K)
	XTEWX(K)
XYCOE	XX(J)
YAW2	T
	T2

READ STATEMENTS: none

WRITE STATEMENTS:

K,XIEX(K),ETAX(K),ZTX(K)
K, ETAX(K), JLEX(K), JTEX(K), XLEWX(K), XTEWX(K)

SUBROUTINE GEOMB

PURPOSE: circular body given by F(X,Y,Z)=0;
computes R,FX,FY,FZ.

CALL: from SETUP (note that this routine is not used in the present version of the program)

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SLOPY	set up to compute wing and body surface slopes

DATA TO COMMON:

COMMON	VARIABLE
INDEX	KROOT
BODV1	KBMX(J)
	R(J)
	NBPTS(J)
	LMX
	LMN
	CFK(K)
	BFK(K)
	AFK(K)
	CFL(I)
	BFL(I)
	AFL(I)
	CBL(I)
	BBL(I)
	ABL(I)
	ACL(I)
	BCL(I)
	CCL(I)
BODV2	KBOD
	LBOD
	FY(N,J)
	FZ(N,J)
	FX(N,J)
	LBU
	LBD

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
AOFAB	.017453293*ALPHAB
M2	NBIN(M)
XBT(M1)	XBIN(M,M1)
RBT(M1)	RBIN(M,M1)
NT	NBIN(M)
XPP(NX)	XIN(J)-XNOSE
NEND	NBPTS(J)
RP	SQRT(ETA(K)**2+ZT(L)**2)
KEND	KBMX(J)
DKP1	ETA(K+1)-ETA(K)
DKP2	ETA(K+2)-ETA(K+1)
DK	ETA(K+2)-ETA(K)
DLP1	ZT(L+1)-ZT(L)
DLP2	ZT(L+2)-ZT(L+1)
DL	
DLM1	ZT(L)-ZT(L-1)
DLM2	ZT(L-1)-ZT(L-2)

READ STATEMENTS: none

WRITE STATEMENTS:

J, XIN(J), XI(J), R(J), N, K, L, ETA(K), ZT(L), FY(N,J), FZ(N,J), FX(N,J), KBMX(J), LBU(K,J), LBD(K,J)

SUBROUTINE GEOMBR

PURPOSE: rectangular body; computes body mesh pts. in fine interior mesh; body slopes

CALL: from SETUP

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
QUIK	to convert body line input to body slopes
SLOPY	to do the streamwise interpolation
SLOPQ	to interpolate for upper and lower body slopes

DATA TO COMMON:

COMMON	VARIABLE
BODV1	XNOSE
	XTAIL
	JNOSE
	JTAIL
BODV2	LBU(K,J)
	LBD(K,J)
	FY
BODV3	LLBU
	LLBL
	KBMAX
	RBCU(K,J)
	RBCL(K,J)
	DRBCU
	DRBCL

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
COE1	local difference coefficient, several different definitions
COE2	local difference coefficient, several different definitions
AOFA	ALPHAW/57.29577951
KBS	K
NPTS	2*KBS+LLBU-LLBL-1
KB	KBS-1

DXU(J)	local variable for interpolation
DXL(J)	local variable for interpolation
L1	LLBL+1
L2	LLBU-1
SALPH	correction factor for angle of attack S(body)/S(BCSS)

READ STATEMENTS: none

WRITE STATEMENTS:

K, KK, ETA(K), J, XIN(J), RBCU(K,J), RBCL(K,J), L, LL, ZT(L), FY(L-LLBL,J)

SUBROUTINE GEOBRX

PURPOSE: rectangular body; computes body mesh pts. in coarse exterior mesh

CALL: from SETUPX

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
QUIKX	generate slopes from body line input
SLOPY	to do the streamwise interpolation
SLOPQ	to interpolate for upper and lower body slopes

DATA TO COMMON

COMMON	VARIABLE
INDEXX	KROOTX
BODV1	XNOSEX
	XTAILX
	JNOSEX
	JTAILX
	KBMXX(J)
BODV2	NBPTSX(J)
	LBUX(K,J)
	LBDX(K,J)
	FYX
BODV3	LLBLX
	LLBUX
	KBMAXX
	RBCUX(K,J)
	RBCLX(K,J)
	DRBCUX
	DRBCLX

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
COE1	local difference coefficient
COE2	local difference coefficient
AOFA	ALPHAW/57.29577951

MAIN INTERNAL SUBROUTINE VARIABLES (cont.)

KBS	K
NPTS	2*KBS+LLBUX-LLBLX-1
KB	KBS-1
DXU(J)	local variable for interpolation
DXL(J)	local variable for interpolation
L1	LLBLX+1
L2	LLBUX-1
SALPHX	correction factor for angle of attack S(body)/S(BCSS)

READ STATEMENTS: none

WRITE STATEMENTS:

K, KK, ETAX(K), J, XINX(J), RBCUX(K,J), RBCLX(K,J), L, LL, ZTX(L), FYX(L-LLBLX,J)

SUBROUTINE TCOEF

PURPOSE: computes difference coefficients with respect to fine mesh

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
GCALC	to prepare coefficients for potential jump and gamma interpolation (used for circular body only)

DATA TO COMMON:

COMMON	VARIABLE
INTER	XIL(J)
	XIR(J)
	XIC(J)
	ETAL(K)
	ETAR(K)
	ETAC(K)
	COEL
	COEU
	ZLVU
	ZRVU
	ZCVU
	ZLVL
	ZRVL
	ZCVL
PARM	A1
	A2
	A3
	A4
	A5
	C2
	COE
	CK1(K)
	CK2(K)
	CK3(K)
	CK4(K)

DATA TO COMMON (cont.)

	CK51(K)
	CK52(K)
XYCOE	XIYK(K,J)
	XIYJ(K,J)
LARGN	DJK1(K,J)
	DJK2(K,J)
	DJK3(K,J)
	DJK4(K,J)
	DJK5(K,J)
	DJK6(K,J)
	DJK7(K,J)
	DJK8(K,J)
	DJK9(K,J)
	DJK10(K,J)
	DJK11(K,J)
LCO	DE1
	DE2
	DE3
	DL1
	DL2
	DL3
	DH1
	DH2
	DH3
LCOX	DK1
	DK2
	DK3
WINGBC	ZLWL
	ZRWU

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
CI	1/CORD(K)
ZL	1/(ZT(L)-ZT(L-1))
ZR	1/(ZT(L+1)-ZT(L))
ZC	1/(ZT(L+1)-ZT(L-1))
H1	local ZT difference
H2	local ZT difference
Z0	trefftz plane ZT difference
ZA	trefftz plane ZT difference
ZB	trefftz plane ZT difference
DZ1	1/(ZA-ZB)
CP	(CORD(K+1)+CORD(K))*.5
CM	(CORD(K)+CORD(K-1))*.5
CC	1/CORD(K)
C32	(CORD(2)+CORD(2))*.5
ETA32	1/(ETA(2)-ETA(1))

DATA TO COMMON (cont.)

XI32	1/(XI(J-1)-XI(J-2))

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE TCOEFX

PURPOSE: computes difference coefficients for coarse exterior mesh

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED: none

DATA TO COMMON:

COMMON	VARIABLE
EXTER	XILX(J)
	XIRX(J)
	XICX(J)
	ETALX(K)
	ETARX(K)
	ETACX(K)
	ZLVLX
	ZRVLX
	ZCVLX
	ZCVUX
	ZLVUX
	ZRVUX
PARM	CK1X(K)
	CK2X(K)
LCOX	DL1X(L)
	DL2X(L)
	DL3X(L)
	DE1X(J)
	DE2X(J)
	DE3X(J)
	DH1X(J)
	DH2X(J)
	DH3X(J)
	DK1(K)
	DK2(K)
	DK3(K)
LARGX	DJK1X(K,J)
	DJK10X(K,J)
	DJK11X(K,J)

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION

CI	1/CORDX
ZL	1/(ZTX(L)-ZTX(L-1))
ZR	1/(ZTX(L+1)-ZTX(L))
ZC	2/(ZTX(L+1)-ZTX(L-1))
ZA	trefftz plane ZT difference
ZB	trefftz plane ZT difference
ZO	trefftz plane ZT difference
DZ1	1/(ZA-ZB)

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE MESHIN

PURPOSE: interpolation searches, and storage of mesh index location and mesh interpolation ratios

This routine determines the indices of coarse mesh points surrounding a given fine mesh point. This information is used in interpolating PHI on the fine mesh boundaries.

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED: none

DATA TO COMMON:

COMMON	VARIABLE
MESHCO	JEX(K,J)
	DXEX(K,J)
	KEX(K)
	DYEX(K)
	LEX(L)
	DZEX(L)
	KEXB
	LEXB
	DYEXB
	DZEXB
	JCUP
	JCDN
	KIN(KX)
	DYIN(KX)
	JINK(KX,JX)
	JINKM1(KX,JX)
	KINB
	DYINB
	LIN(LX)
	DZIN(LX)
	LINB(LX)
	DZINB(LX)

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE WINGCO

PURPOSE: generates wing boundary conditions

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SCALE	scales airfoil ordinates to a 0-1 reference frame, and optionally smooths the airfoil ordinates in arc length (both x&y vs s)
SLOPY	interpolates optional twist table to ETA grid locations
SLOPY2	compute airfoil slopes
FLIN	statement function for linear interpolation

DATA TO COMMON:

COMMON	VARIABLE
INDEX	JLE(K), redefined if 1st mesh point is too close to leading edge
WINGBC	TWIST(I)
	WBCU(K,J)
	WBCL(K,J)
WINGX	WBCUOR(K,J)
	WBCLOR(K,J)
NSBL	XOUTA
	ZOCU
	ZOCL

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
AOFA	.017453293*ALPHAW
WCOE	MACHNO**EMEXP(2)
RAD	180/PI
ETAKD(I)	ETA(I)/SSPAN
NPANM1	NPAN-1
NP1	N+1

CR	CORDIN(N)
CT	CORDIN(NP1)
RFACT1	used to automatically include Riegels' factor when the leading edge and XI=0 line do not coincide
TWSTR	THETP(N)/RAD
TWSTT	THETP(N+1)/RAD
ZLER	CR*SIN(TWSTR)
ZLET	CT*SIN(TWSTT)
Y	ETA(K)/SSPAN
C	CORDW(K)
NX	J2-J1+1
J3	J-J1+1
XOUT	(X(K,J)-XLEW(K)))/c
LS	K
YR	YP(N)
YT	YP(NP1)
ZLE	FLIN(ZLER,ZLET,Y,YR,YT)
THETA	TWIST(K)*RAD
INL	INLX(N)
INT	INUX(N)
JU	NX+J
JL	NX+1-J
QU	local upper surface Z's
QL	local lower surface Z's
DZU	local upper surface dZ/dX's
DZL	local lower surface dZ/dX's
TEMPL	DZL(J)/SQRT(1.0+RFACT1*DZL(J)**2)
TEMPU	DZU(J)/SQRT(1.0+RFACT1*DZU(J)**2)

READ STATEMENTS: none

WRITE STATEMENTS:

M, XOUT(M), QU(M), QL(M), DZU(M), DZL(M),DDZU(M), DDZL(M)

SUBROUTINE TOPBOD

PURPOSE: substitutes wing slopes for body slopes on body (not used in present version of code)

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED: none

DATA TO COMMON:

COMMON	VARIABLE
BODV3	RBCU(K,J)

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
J1	JLE(K)
J2	JTE(K)
JWBC	J+1-J1

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SLOPY

PURPOSE: transforms (x,y) pairs to another set of x's and provides y and dy/dx at the new x's using cubic splines

CALL: from GEOMB, GEOMBR, GEOBRX, WINGCO

CALL STATEMENT:

ARGUMENT	DESCRIPTION
XX	x location of input values
YY	function values at the XX locations
NN	number of XX's
XOUT	X location where Y and dY/dX is desired
NXX	number of XOUTS's
Z	function values at the XOUT locations
DZ	function slope at the XOUT locations

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SPLN1	spline fit routine
SPLN1X	spline fit routine
DFUBB	statement function

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
DX3	X(N-1)-X(N)
DX4	1.0+((X(N-2)-X(N-1))/(X(N-1)-X(N))
DY2	DFUBB(Y(N),Y(N-1),Y(N-2),DX3,DX4)
DX1	X(2)-X(1)
DX2	1.0+((X(3)-X(2))/(X(2)-X(1))
DY1	DFUBB(Y(1),Y(2),Y(3),DX1,DX2)
XP	XOUT(I)
Z(I)	YP
DZ(I)	DYP

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SPLN1

PURPOSE: Standard NASA Ames Spline Fit Routine

CALL: from SETUP, SETUPX, SIOPY, BLLAM

CALL STATEMENT:

ARGUMENTS	DESCRIPTION
X	independent variable input
Y	dependent variable input
N	number of X's
DY1	1st or 2nd derivative at lower end of table
DY2	1st or 2nd derivative at upper end of table
K1	=1, DY1=1st derivative, =2, DY1=2nd derivative
K2	=1, DY2=1st derivative, =2, DY2=2nd derivative
XP	independent variable locations where information is desired
YP	function at XP
DYP	function slope at XP
DYPP	second derivative at XP

SUBROUTINES CALLED: none

ENTRY point SPLN1X used for actual interplolation

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SMTH

PURPOSE: Standard NASA Ames smoothing routine

CALL: from SCALE, VISCFL

CALL STATEMENT.

ARGUMENT	DESCRIPTION
Y	function value, routine returns with smoothed values
N	number of input values of Y
K	=1, end points smoothed also, end points remain fixed otherwise
X	location of function values, Y(X)

SUBROUTINES CALLED: none

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE IC

PURPOSE: generates coefficients for interpolation and extrapolation formulas and initializes potential arrays, also reads old solution from tape or disk in order to restart calculation

CALL: from MAIN

CALL STATEMENT:

ARGUMENT	DESCRIPTION
ITER	set to zero or read from saved solution

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
GCALC	setup of potential jump and gamma calculation (circular body only)
INTERP	interpolate to another mesh if MSHINT is true
VTRANS	interpolation of old boundary layer slopes to new grid

DATA TO COMMON:

COMMON	VARIABLE
INTER	PDUM(K)
JUMP	AZU
	AZL
	BZU
	BZL
	CZU
	CZL
	PJUMP(K,J)
LARGN	PF(L,K,J)
LARGX	PC(L,K,J)
OLD	PJUMPO
	JMO
	KMO
	LMO
	LWUO
	XIO(J)

ETAO(K)
ZTO(L)
PJUMPT(K)
FINE

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
ITER	0 or last value of previous solution
N	KBMXO(J)
ZTWING	(ZT(LWINGU)+ZT(LWINGL))/2

READ STATEMENTS:

ITERO, JMO, KMO, LMO, LWUC, KTO, XIO(J), ETAO(K), ZTO(L), JNOSEO, JTAILO, KBMXO(J), LBUO(K,J), LBDO(K,J), PJUMPO(K), PF(L,K,J)

WRITE STATEMENTS:

ITERO, JMO, KMO, LMO, LWUO, KTO, PJUMPO(K), XIO(J), ETAO(K), ZTO(L)

SUBROUTINE INTERP

PURPOSE: linearly interpolates previously stored solution for use as initial conditions

CALL: from IC

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION	
READEC	(block data transfer)	CDC version only

DATA TO COMMON:

COMMON	VARIABLE
OLD	PJUMPT(K)
LARGN	PF

READ STATEMENTS:

PF(L,K,J), PC(L,K,J)

WRITE STATEMENTS:

PD(L,K)

SUBROUTINE SOIVE

PURPOSE: the control subroutine for the SLOR algorithm; setup and solution of tridiagonal matrix system in fine interior grid

CALL: from MAIN

CALL STATEMENT:

ARGUMENT	DESCRIPTION
ITER	total number of iterations
ITERF	number of fine grid iterations for this submission (compared to MAXIT to determine when iteration limit is reached)
CONVG	logical variable to indicate convergence criteria satisfied

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
DBNDY	set downstream φ values
FARBDY	calculate PHI on fine-coarse mesh interface
GCALC	interpolate gamma (for circular body only)
PHIBOD	calculate PHI on body surface (circular body only)
MURMAN	used to modify boundary conditions downstream of shock to simulate shock-b.l. interaction
XLDX	integration of PJUMP to get lift
READEC	(block data transfer) CDC version only
WRITEC	(block data transfer) CDC version only
TEST	statement function

DATA TO COMMON:

COMMON	VARIABLE
INTER	PDUM
	EDUM
INDEX	JP1
FLAGS	ISAVE
RELAXP	KOUNT
	NSUP

DATA TO COMMON (cont.)

	BIGRL	
	ERROR	
	JRD	
	KRD	
	LRD	
	JE	
	KE	
	LE	
	RESIDJ(K)	
JUMP	COPF	
SCRACH	MU	
	POLD	
	VC	
	VC2	
EPLT	ERROF	
	CEF	
	RSDOF	
	CRF	
	ERRF	
	RSDF	

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
KLAST	KTIP-KROOT+1
KB	KBMX(1)
COE2	(ETA(KB+1)-0.5*(ETA(KB)+ETA(KB-1)))/(ETA(KB+1) -ETA(KB))
COE1	1-COE2
MESH	JMAX*KMAX*LMAX
CONVG	logical variable to signal convergence
ITERF	ITERF+1
ITER	ITER+1
RSDAV	average residual in fine mesh
ERRAV	average error in fine mesh
J	streamwise computational plane counter
CLG	-COE*XLOAD/(CAV*SSPAN)
DENM	ETA(MM)**2+C2*ZT(M)**2
RDST	SQRT(X(MM,1)**2+A1*DENM/C2)
P	the potential function PHI
DE2W	DE2(J)*WI
EPSX	time dependent solution like damping factor
DENUP	upper grid boundary distance
RUP	far field b.c. factor
DENDN	ETA(M)**2+C2*ZT(1)**2
RDOWN	far field b.c. factor
DENSID	ETA(KMAXX)**2+C2*ZT(M)**2
DE1J	DE1(J)

MAIN INTERNAL SUBROUTINE VARIABLES (cont.)

DE2J	DE2(J)
DE3J	DE3(J)
DH1J	DH1(J)
L1	2
L2	LMAX1
JP	J plane in moving J plane "window"
JM1	JP-1
JM2	JP-2
PJMAX	maximum change in PJUMP at each iteration
JPS	JP
JP1S	JP1
DE2W	DE2(J)*WI
RDOWN	far field b.c. factor
RSID	far field b.c. factor
KP1	K+1
KM1	K-1
DE1J	DE1(J)
DE2J	DE2(J)
DE3J	DE3(J)
DH1J	DH1(J)
DH2J	DH2(J)
DH3J	DH3(J)
D1	DJK1(K,J)
D2	DJK2(K,J)
D3	DJK3(K,J)
D4	DJK4(K,J)
D5	DJK5(K,J)
D6	DJK6(K,J)
D7	DJK7(K,J)
D8	DJK8(K,J)
D9	DJK9(K,J)
D10	DJK10(K,J)
D11	DJK11(K,J)
CC1	CK1(K)
CC2	CK2(K)
CC3	CK3(K)
CC4	CK4(K)
CC51	CK51(K)
CC52	CK52(K)
PXM(L)	(P(L,K,JP)-POLD(L,K,II2))*XIL(J)
PXP(L)	(P(L,K,JP1)-P(L,K,JP))*XIR(J)
B	tridiagonal matrix array
D	tridiagonal matrix array
A	tridiagonal matrix array
C	tridiagonal matrix array
PXI	.5*(PXP(L)+PXM(L))
PY	dissipation term
COED	2*CORD(K)*VC(L,K,I1)*PY
JWBC	J+1-JLE(K)

MAIN INTERNAL SUBROUTINE VARIABLES (cont.)

LA	LBD(K,J)
LB	LBU(K,J)
L	sidewall counter
CORD1	.5*(CORD(K)+CORD(K+1))
CORD2	.5*(CORD(K)+CORD(K+1))
ABSD	ABS(D(L))
PXT	EPSX
DNOM	1/(B(1)-A(1)*B(I-1))
ITSM1	LMAX-3
I	LMAX1-II
RESID	D(L)
ARESID	ABS(RESID)
PTEL	lower extrapolation to get PJUMP
PJNEW	updated PJUMP value
APJ	ABS(RESIDJ(K))
KPJ	K
ERRI	ERROR
RSDI	BIGRL
ERRL	ALOG10(ERROF)
RSDL	ALOG10(RSDOF)

READ STATEMENTS: none

WRITE STATEMENTS:

ITER, ERROR, ERRAV, JE, KE, LE, BIGRL, RSDAV, JRD, KRD, LRD, NSUP, CLG, PJMAX, KPJ, RESIDJ(K)

SUBROUTINE STORE

PURPOSE: stores the solution for later interpolation to finer mesh

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED: none

DATA TO COMMON:

COMMON	VARIABLE
OLD	XIO(J)
	KBMXO(J)
	ETAO(K)
	ZTO(L)
	LBUO(K,J)
	LBDO(K,J)
	PJUMPO(K)
	JMO
	KMO
	LMO
	JTAILO
	JNOSEO
	LWUO

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
JNDX	JTE(K)

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE FARBDY

PURPOSE: calculates PHI on exterior-interior mesh interface

CALL: from SOLVE

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
PFINT	interpolates PHI from coarse to fine mesh points

DATA TO COMMON:

COMMON	VARIABLE
LARGN	PF

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SOLVEX

PURPOSE: setup and solution of tridiagonal matrix system in coarse exterior cartesian grid

CALL: from MAIN

CALL STATEMENT:

PROGRAM	ARGUMENT	DESCRIPTION
MAIN	ITER	total number of iterations
	ITEC	total number of crude gid iterations in this submission
	CONVG	convergence of crude grid

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
BODBDY	body surface boundary interpolation from fine mesh solution
READEC	(block data transfer) CDC version only
WNGBDY	wing surface boundary interpolation from fine mesh solution
WRITEC	(block data transfer) CDC version only
TEST	statement function

DATA TO COMMON:

COMMON	VARIABLE
INDEXX	JP1X
FLAGS	ISAVE
RELAXP	KOUNT
	NSUP
	BIGRL
	ERROR
	JRD
	KRD
	LRD
	JE
	KE
	LE
SCRACH	MU
	POLD
	VC

EPLT	ERROX
	CEX
	RSDOX
	CRX
	ERRX
	RSDX

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
KB	KBMXX(1)
COE1	1-COE2
MESH	JMAXX*KMAXX*LMAXX
ITER	ITER+1
ITERC	ITERC+1
RSDAV	average residual in crude grid
ERRAV	average error in crude grid
DENM	ETAX(MM)**2+C2*ZTX(M)**2
RDST	SQRT(XX(1)**2+A1*DENM/C2)
JP	J plane in moving "window"
JP1	JP+1
JM2	JP-2
DE2W	DE2X(J)*WIX
EPSX	dissipation factor (time-like damping)
DENUP	far field b.c. factor
RUP	SQRT(XX(J)**2+A1*DENUP/C2)
DENDN	far field b.c. factor
RDOWN	far field b.c. factor
DENSID	far field b.c. factor
RSID	far field b.c. factor
KP1	K+1
KM1	K-1
PXM(L)	(PP(L,K,JP)-POLD(L,K,II2))*XILX(J)
PXP(L)	(PP(L,K,JP1)-PP(L,K,JP))*XIRX(J)
B	tridiagonal matrix solution array
D	tridiagonal matrix solution array
A	tridiagonal matrix solution array
C	tridiagonal matrix solution array
CI	1/CORDX
LA	LLBLX+1
LB	LLBUX-1
ABSD	ABS(D(L))
PXT	EPSX
DNOM	1/(B(I)-A(I)*B(I-1))
ITSM1	LMAXX-3
RESID	D(L)
ARESID	ABS(RESID)
ERRI	ERROR

MAIN INTERNAL SUBROUTINE VARIABLES (cont.)

RSDI	BIGRL
ERRL	ALOG10(ERROX)
RSDL	ALOG10(RSDOX)
CONVG	logical variable to indicate crude grid convergence

READ STATEMENTS: none

WRITE STATEMENTS:

ITER, ERROR, ERRAV, JE, KE, LE, BIGRL, RSDAV, JRD, KRD, LRD, NSUP

SUBROUTINE WNGBDY

PURPOSE: calculates PHI at wing surface by interpolating from the fine mesh solution

CALL: from SOLVEX

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
PCINT	interpolation of PHI from fine to coarse mesh points

DATA TO COMMON

COMMON	VARIABLE
JUMP	PJUMPX
LARGX	PC(LX,KX,JX)

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE BODBDY

PURPOSE: interpolates PHI at body surface from the mesh solution

CALL: from SOLVEX

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
PCINT	interpolation of PHI from fine to coarse mesh points

DATA TO COMMON

COMMON	VARIABLE
JUMP	PJUMPX
LARGX	PC(LX,KX,JX)

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
LA	LLBLX+1
LB	LLBUX-1
JX1	JCUP+1
JX2	JCDN-1
J2	JINK(1,JX)
J1	J2-1
DX	(XX(JX)-X(1,J1))/(X(1,J2)-X(1,J1))
K2	KINB(KX)
K1	K2-1
DY	DYINB(KY)
DZ	DZINB(LLBUX)
L2	LINB(LLBUX)
L1	L2-1
F1	PJUMP(K1,J1)+(PJUMP(K1,J2)-PJUMP(K1,J1))*DX
F3	PJUMP(K2,J1)+(PJUMP(K2,J2)-PJUMP(K2,J1))*DX

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE GCALC

PURPOSE: to interpolate gamma; put into two-dimensional array PJUMP

CALL: from TCOEF, IC, SOLVE

CALL STATEMENT:

ARGUMENT	DESCRIPTION
KODE	=1 sets up coefficients =2 evaluate PJUMP using PJNEW
PJNEW	potential jump at trailing edge

SUBROUTINES CALLED: (none)

DATA TO COMMON:

COMMON	VARIABLE
JUMP	KPINDX PCOEF(K,J) PJUMP(K,J)

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
KRM1	KROOT-1
KRP1	KROOT+1
JTEMIN	minimum J at trailing edge
ETIP	.5*(ETA(KTIP)+ETA(KTM1))
RSAME	logical to test on R(J)
RJS	R(J)**2
PJNEW(KTIP)	0
JJ	J-1
RFACT	located in equivalence statement in INTER
ENEW(K)	located in equivalence statement in INTER

READ STATEMENTS: none

WRITE STATEMENTS:

K, KK, L

SUBROUTINE DBNDY

PURPOSE: to solve downstream trefftz plane in fine mesh
(used when calculating fine mesh alone, EXTMSH = F)

CALL: from SOLVE

CALL STATEMENT: no arguments

SUBROUTINES CALLED: (none)

DATA TO COMMON:

COMMON	VARIABLE
RELAXP	BIGRL
	JRD
	KRD
	LRD
	ERROR
	JE
	KE
	LE
PARRY	P

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
C2I	1/C2
ESQ	C2I*ETA(K)**2
XSQ	X(K,JMAX)**2
RD	SQRT(XSQ+A1*(ESQ+ZT(L)**2)
ZT1	ZT(1)
ZT2	ZT(LMAX)
ZT1SQ	C2*ZT1**2
ZT2SQ	C2*ZT2**2
TCOF1	2*COFF*ZT1
TCOF2	2*COFF*ZT2
ETASQ	ETA(K)**2
TCOF	2*COFF
A	tridiagonal matrix coefficient
B	tridiagonal matrix coefficient
C	tridiagonal matrix coefficient

MAIN INTERNAL SUBROUTINE VARIABLES (cont.)

D	tridiagcnal matrix coefficient
L1	LBD(K,JMAX)
L2	LBU(K,JMAX)
DDY	ETAR(K)*ETAC(K)
ABSD	ABS(D(L))
DNOM	1/(B(L)-A(L)*B(L-1))
ARESID	ABS(D(L))

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE DBNDYX

PURPOSE: to solve downstream trefftz plane in coarse mesh (not used)

CALL: from SOLVEX when used

CALL STATEMENT:

SUBROUTINES CALLED: none

DATA TO COMMON:

COMMON	VARIABLE
RELAXP	BIGRL
	JRD
	KRD
	LRD
	ERROR
	JE
	KE
	LE
PARRY	P

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
JP1	JP1X
C2I	1/C2
ESQ	C2I*ETAX(K)**2
XSQ	XX(JMAXX)**2
RD	SQRT(XSQ+A1*(ESQ+ZTX(L)**2))
ZT1	ZTX(1)
ZT2	ZTX(LMAXX)
ZT1SQ	C2*ZT1**2
ZT2SQ	C2*ZT2**2
TCOF1	2*COFF*ZT1
TCOF2	2*COFF*ZT2
ETASQ	ETAX(K)**2
TCOF	2*COFF
A	tridiagonal matrix coefficient
B	tridiagonal matrix coefficient
C	tridiagonal matrix coefficient
D	tridiagonal matrix coefficient

MAIN INTERNAL SUBROUTINE VARIABLES (cont.)

L1	LLBLX+1
L2	LLBUX-1
DDY	ETARX(K)*ETACX(K)
ABSD	ABS(D(L))
DNOM	1/(B(L)-A(L)*B(L-1))
ITSM1	LMAXX-3
ARESID	ABS(D(L))

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE PHIBOD

PURPOSE: computes potential at circular body pts.

CALL: from SOLVE (not used in present code)

CALL STATEMENT:

SUBROUTINE	ARGUMENT	DESCRIPTION
SOLVE	J	computation plane

SUBROUTINES CALLED: none

DATA TO COMMON:

COMMON	VARIABLE
LARGN	PF

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
CYD	AFK(K)*FY(N,J)
A11	ACL(2)*FZ(N,J)
A12	CYD+BCL(2)*FZ(N,J)
DZ1	.5/(ZT(L+1)-ZT(L))
JWBC	J+1-JLE(K)
A21	CYD+BCL(1)+FZ(N,J)
A22	CCL(1)*FZ(N,J)
DNOM	1/(A11*A22-A12*A21)

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE OUTBOD

PURPOSE: for data output and catalog of circular body CP's

CALL: from MAIN (not used in present version of program)

CALL STATEMENT: no arguments

SUBROUTINES CALLED: none

DATA TO COMMON:

COMMON	VARIABLE
INDEX	JP1

MAIN INTERNAL SUBROUTINE VARIABLES

VARIABLE	DESCRIPTION
AOFAB	.017453293*ALPHAB
JEND	JMAX-1
DJM1	XI(J)-XI(J-1)
DJP1	XI(J+1)-XI(J)
LUM1	LBOD(1,J-1)
LUO	LBOD(1,J)
LUP1	LBOD(1,J+1)
N	NBPTS(J)
NM1	NBPTS(J-1)
NP1	NBPTS(J+1)
LLM1	LBOD(NM1,J-1)
LLO	LBOD(N,J)
LLP1	LBOD(NP1,J+1)
DRM1	R(J)-R(J-1)
DRP1	R(J+1)-R(J)
DSM1	SQRT(DJM1**2+DRM1**2)
DSP1	SQRT(DJP1**2+DRP1**2)
FX1	FX(1,J)
ARCT	ATAN(FX1)
COST	COS(ARCT)
SINT	SIN(ARCT)
PZU	-FX1/FZ(1,J)-AOFAB
PZL	-FX1/FZ(N,J)-AOFAB
CPU	-2*PXU-PZU**2
CPL	-2*PXL-PZL**2

MAIN INTERNAL SUBROUTINE VARIABLES (cont.)

PXU	(PSU-PZU*SINT)/COST
PXL	(PSL+PZL*SINT)/COST

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE OUTP

PURPOSE: computes and outputs wing surface CP and sonic line values

CALL: from MAIN

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
FORCE	computes forces and moments
SQRT	(in library)
XLDX	integrates potential jump at trailing edge to obtain lift coefficient
GRAPH3	assembles plot routines
BLOUT	generates the input data set required for a NASH/SCRUGGS boundary layer calculation

DATA TO COMMON:

COMMON	VARIABLE
INTER	PDUM
	EDUM
LOCAL	XOC(K,J)
	LSONU(K,J)
	LSONL(K,J)

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
KLAST	KTIP-KROOT+1
J	J plane counter to locate downstream position
CLG	-COE*XLOAD/(CAV*SSPAN)
EMSQ	MACHNO**2
CPSTAR	(EMSQ-1)/(1.2*EMSQ)
LWUP1	LWINGU+1
LWLM1	LWINGL-1
DENWU	ZT(LWINGU)-ZT(LWUP1)
ZTWING	(ZT(LWINGU)+ZT(LWINGL))*.5
CWU	
CWU	Z difference coefficient for CP calculation

MAIN INTERNAL SUBROUTINE VARIABLES (cont.)

DENWL	ZT(LWINGL)-ZT(LWLM1)
CWL	Z difference coefficient for CP calculation
SONP	sonic point
KBEG	KROOT
CI	.5/CORD(K)
CUL	XIL(J)*CI
CUR	XIR(J)*CI
LLBU	LBU(K,J)
LBUP1	LLBU+1
LLBD	LBD(K,J)
LBDM1	LLBD-1
L1	LWINGL-LLBD+1
L2	L1+1
L1U	LLBU-LWINGU+1
L2U	L1U+1
CBU	upper body surface CP Z difference coeff.
CBBL	lower body surface CP Z difference coeff.
LSIDE	LLBU-LLBD+1
LSIDEU	LWINGU-LLBD+1
COLPZT	21.5/ZT(LMAX)
EMU	upper surface Mach number
EML	lower surface Mach number
LU	LSONU(K,J)
ZSONU	sonic region height
LL	LSONL(K,J)
ZSONL	sonic region height
NSONU	ZSONU*COLPZT+NAX+.5
NSONL	ZSONL*COLPZT+NAX+.5
NCPU	NAX-CPU(K,J)*COLPCP+.5
NCPL	NAX-CPL(K,J)*COLPCP+.5
DCP	CPL(K,J)-CPU(K,J)
LLBDX	LLBD+L-1
JL	JLE(K)
JT	JTE(K)
CPL(K,J)	located in equivalence statement in PARM
CPU(K,J)	located in equivalence statement in SCRACH
LINE	located in equivalence statement in LCO
PU(IS)	located in equivalence statement in LCO
PL(IS)	located in equivalence statement in LCO

READ STATEMENTS: none

WRITE STATEMENTS:

PJUMP(K,JTE(K)), K, ETASPN, ETA(K), J, XOC(K,J), CPU(K,J), CPL(K,J), EMU, EML, DCP, ZSONU, ZSONL, LINE, XOC(KROOT,J), L, ZT(LLBDX), CPS(L,J), TITLE, KTM1, JLE(K), JTE(K)

SUBROUTINE FORCE

PURPOSE: calculates forces and moments

CALL: from OUTP

CALL STATEMENT:

ARGUMENT	DESCRIPTION
CLG	the lift coefficient computed in OUTP from the integration of the potential jump at the trailing edge

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SIMP	Simpson's rule integration

DATA TO COMMON:

COMMON	VARIABLE
INTER	COEU
	COEL
INDEX	JWLE
	JWTE
	BODV1
	BCL

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
H1	
H2	
AOFA	.017453293*ALPHAW
NINT	JWTE-JWLE+1
JD	JJ-JWLE+1
WCOE	MACHNO**EMEXP(2)
BCU	
CM	CM-CN*XMOM*CORD(KK)/CMEAN
C	
KNDX	KTIP-KROOT
CNW	CNW/SSPAN

CAW	CAW/SSPAN
CLW	CLW/SSPAN
CDW	CDW/SSPAN
DCP(JJ)	located in equivalence statement in LCO
DCPX(JJ)	located in equivalence statement in LCO
DCPS(JJ)	located in equivalence statement in LCO
CL(KK)	located in equivalence statement in LCO
CD(KK)	located in equivalence statement in LCO
CNCB(KK)	located in equivalence statement in INTER
CMC2(KK)	located in equivalence statement in INTER
CACB(KK)	located in equivalence statement in INTER

READ STATEMENTS: none

WRITE STATEMENTS:

TITLE, MACHNO, ALPHAW, ALPHAB, CAV, XMOM, N, ETA(N), C, CNCB(N), CACB(N), CMC2(N), CL(N), CD(N), CNW, CAW, CLW, CLG, CDW

SUBROUTINE SIMP

PURPOSE: the Standard NASA Ames Simpson's rule integration

CALL: from FORCE,XLDX,VISCFL

CALL STATEMENT:

ARGUMENT	DESCRIPTION
R	integral of Y from X(1) to X(N)
X	independent variable
Y	dependent variable
N	number of X's input
IER	=1 - normal execution
	=2 - N < or =1
	=4 - input independent variable not monotonic

SUBROUTINES CALLED: none

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE ERPLOT

PURPOSE: to make a plot of the convergence history of the largest residual and the largest correction.

CALL: from MAIN

CALL STATEMENT:

ARGUMENT	DESCRIPTION
IGRID	=1 for fine grid, =2 for coarse grid
KOUNT	number of iterations
CE	offset to ensure correction plot starts at right of page
ERRO	initial value of correction
ERR	array of log10 (correction)
CR	offset to ensure residual plot starts at right of page
RSDO	initial value of residual
RSD	array of log10 (residual)

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIALBES:

VARIABLE	DESCRIPTION
K	iteration counter
LINE	array used to store and print plotting symbols
J	position of plotting symbol in array LINE

READ STATEMENTS: none

WRITE STATEMENTS:

[illegible]

SUBROUTINE SCALE

PURPOSE: to scale airfoil coordinates to the local chord and to optionally smooth the coordinates in arc length (both x and y versus s)

CALL: from WINGCO

CALL STATEMENT:

ARGUMENT	DESCRIPTION
N	the input span station number

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SMTH	standard NASA-Ames smoothing routine

DATA TO COMMON:

COMMON	VARIABLE	
WING	INUX(N)	the number of upper surface points at span station N
	INLX(N)	the number of lower surface points at span station N
	XF(I<N)	the X-coordinates of the airfoil; I runs from the lower surface t.e. to the upper surface t.e.
	ZF(I<N)	the Z-coordinates of the airfoil

MAIN INTERNAL SUBROUTINE VARIABLES

VARIABLE	DESCRIPTION
[illegible]	local value of INUX(N)
[illegible]	local value of INLX(N)
[illegible]	total number of airfoil coordinates
[illegible]	counter on number of smoothings
[illegible]	X-coordinate of leading edge

CHRD	local chord length
ZREF	Z-coordinate of leading edge
S	array of arc length
X	local array of X-coordinates
Z	local array of Z-coordinates

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SLOPY2

PURPOSE: to compute wing surface slopes using spline fits of x and z versus arc length

CALL: from WINGCO

CALL STATEMENT:

ARGUMENT	DESCRIPTION
XX	X-array of airfoil coordinates
ZZ	Z-array of airfoil coordinates
L	location of leading edge point
N	number of airfoil coordinates
XO	array of X-points at which slopes are required
NO	number of points in XO array
ZO	array of Z-coordinates at XO-points; contains both upper and lower surface points
DZO	array of wing surface slopes; calculated as (dz/ds)/(dx/ds)

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SPLIFM	spline fitting routine to fit XX(SA) and to determine the doubly defined values of SI(XO); also calculates ds/dx
SPLIF	spline fitting routine to fit ZZ(SA) and interpolate to find ZO(SI); also calculates dz/ds
DFUBB	function statement to determine end point slopes required for spline fitting routines

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
NOT	number of XO points to be calculated;

	= 2*NO
X	local array for the XX array
Z	local array for the ZZ array
SA	arc length array; = 0. at lower surface trailing edge
DZDX1	slope at lower surface trailing edge
DXDS1	dx/ds at lower surface trailing edge
DZDS1	dz/ds at lower surface trailing edge
DZDX2	slope at upper surface trailing edge
DXDS2	dx/ds at upper surface trailing edge
DZDS2	dz/ds at upper surface trailing edge
SI	array of arc lengths corresponding to XO points calculated in SPLIFM
DSDX	array of ds/dx calculated in SPLIFM
DZDS	array of dz/ds calculated in SPLIF
DZO	airfoil slopes = DZDS*DSDX

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SPLIFM

PURPOSE: computes a cubic spline through given F(S) and uses Newton's method to interpolate the doubly defined array SI(FI); also calculate dS/dF

CALL: from SLOPY2

CALL STATEMENT:

ARGUMENT	DESCRIPTION
L	location of leading edge point
N	number of points in S and F arrays
S	array of independent variables
F	array of dependent variables
FP	array for storing dF/dS
FPP	array for storing d2f/dS2
FPPP	array for storing d3F/dS3
NX	number of points in FI array
SI	values of S at each FI
FI	array of points for interpolation
FIP	values of dS/dF at each FI
KM	order of derivative at left end point of S
VM	value of derivative there
KN	order of derivative at right end point of S
VN	value of derivative there

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SPLIF

PURPOSE: computes a cubic spline through given F(S) and interpolates to determine FI(SI); also calculates dFI/dSI

CALL: from SLOPY2

CALL STATEMENT:

ARGUMENT	DESCRIPTION
N	number of points in S and F arrays
S	array of independent variables
F	array of dependent variables
FP	array for storing dF/dS
FPP	array for storing d2F/dS2
FPPP	array for storing d3F/dS3
NX	number of points in SI array
SI	array of points for interpolation
FI	values of F at each SI
FIP	values of dF/dS at each SI
KM	order of derivative at left end point of S
VM	value of derivative there
KN	order of derivative at right end point of S
VN	value of derivative there

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE XMESH

PURPOSE: computes the X-direction grid distribution for an airfoil from an analytical stretching function

program contributed by Terry Holst, NASA Ames

CALL: from FINGRD

CALL STATEMENT:

ARGUMENT	DESCRIPTION
X	output array containing XI grid
DXLE	grid spacing at l.e. (chords)
DXTE	grid spacing at t.e. (chords)
DXMAX	max grid spacing on the airfoil
NI	number of XI grid points generated
NF	number of grid points upstream of airfoil leading edge
NB	number of grid points downstream of airfoil trailing edge
XDIST	total extent of XI grid
XLE	x distance from front of grid to l.e.
IOUT1	=1 to print out grid distribution
IOUT2	=1 to print out iteration parameters

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
FAUX	statement function
FUN	statement function

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
RFACT	.3
A	2
DXMAX	DXMAX/1.1
Z2	
A1	.0625-.25*Z2

MAIN INTERNAL SUBROUTINE VARIABLES(cont.)

A2	.125*A+1
A3	XN**4-Z2*XN**2
A4	A*XN**3+1
A5	A4/A2
D1	DXLE/(DXMAX*A5)
D2	DXTE/(DXMAX*A5)
A6	XN*D1+.5
A7	D1-1
A8	A1-A3*D1
A9	XN*D2-.5
A10	D2-1
A11	A1-A3*D2
B	(A6*A11-A8*A9)*DENOM
C	(A10*A8-A7*A11)*DENOM
D	A2*DXLE/(A1-.5*C+B)
CA	A*XN
CB	XN**2
C1	3*CA*XN
C2	CB*(CB-Z2)+C*XN+B
C3	CA*CB+1
C4	(4*CB-2*Z2)*XN+C
C5	6*CA
C6	12*CB-2*Z2
FUNX	-C1*C2+C3*C6
FUNXX	-C5*C2+C3*C6
XNP	XN-FUNX/FUNXX
X1	XN+.5
NF2	NF+2
ETE	.5*(ETEH+ETEL)
ELE	.5*(ELEH+ELEL)
IM	I-1
TOL	1.1*DXMAX
XTE	XDIST-XLE
E2	(E2L+E2H)*.5
NFM	NF-1
E1	(E1L+E1H)*.5
IX	NF-I
IXP	IX+1
XNORM	1/X(NTE)

READ STATEMENTS: none

WRITE STATEMENTS:

I, X(I), DX

SUBROUTINE XC2

PURPOSE: crude X mesh generation

CALL: from SETUPX

CALL STATEMENT:

ARGUMENT	DESCRIPTION
XLE	leading edge location
XTE	trailing edge location
KTM1	number of span staions
XIN	output crude X grid
JMAX	number of X's generated
XOR	origin of XI grid
CORDX	root chord of XI=1-x=0 line
IOUT1	grid iteration output
KROOT	1st span station to consider

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
CMIN	minimum chord on wing
CMAX	maximum chord on wing
XMAX	maximum X of trailing edge
XMIN	minimum X of leading edge
JMAX	30
DEL	.3*CMIN
NU	.6*JMAX
ND	JMAX-NU
NA	NU+1
DX	DXM1+DDX
XUD	(XA(NA)-XOR)/CORDX
XDOWN	(X(ND)-XOR)/CORDX

READ STATEMENTS: none

WRITE STATEMENTS:

XIN(I), N

SUBROUTINE BEND

PURPOSE: generates the mesh bending at wing-body junction for both the initial and fine meshes

CALL: from SETUP and FINGRD

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
FLIN	statement function for linear interpolation

DATA TO COMMON:

COMMON	VARIABLE
WING	NSO
	NXO
	KXO
	YXO
	XXO
	DXRO
	DXTO
	NS1
	NX1
	KX1
	YX1
	XX1
	DXR1
	DXT1

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
DY	half the range in ETA for mesh bending = .05*SSPAN
KB	value of K for ETA.GE.YRB
KF	value of K at last ETA.LE.ETA(KB)+2*DY

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE FINGRD

PURPOSE: to generate the initial and fine grids

CALL: from SETUP

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
XMESH	to compute the X-direction grid distribution
BEND	to check that XI grid will cover planform
FLIN	statement function for linear interpolation

DATA TO COMMON:

COMMON	VARIABLE
INTER	XI
	ZT
	ETA(K)
INDEX	LWINGU
	LMAX
	KMAX
	KTIP
	JMAX

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
YFACT	stretching factor for initial ETA mesh
DFACT	initial ETA grid YFACT control
DETA	ETA(K)-ETA(K-1)
ZT1	internal table for Z grid
ZFACT	=1, fine grid,=5 initial grid
DMPLE	distance between mapping and planform l.e.
DMPTE	distance between mapping and planform t.e.
XNW	KTIP-1
DETA	1/(XNW-.5)

READ STATEMENTS: none

WRITE STATEMENTS: none

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AN AUTOMATED PROCEDURE FOR COMPUTING THE THREE-DIMENSIONAL TRAN--ETC(U)
FEB 78 W H MASON, D MACKENZIE, M STERN F33615-75-C-3073
UNCLASSIFIED AFFDL-TR-77-122-VOL-2 NL

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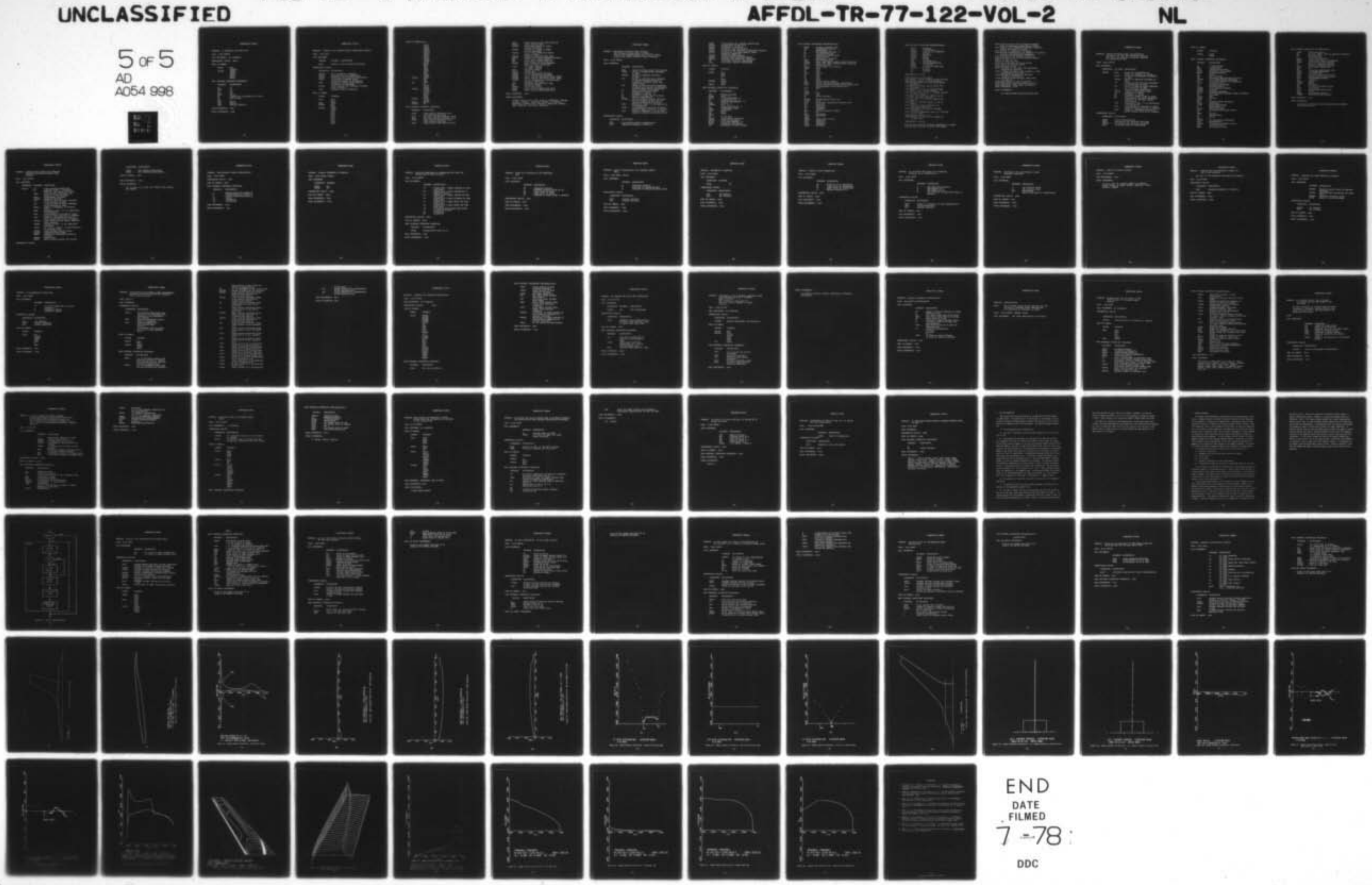

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SUBROUTINE CRDGRD

PURPOSE: to generate the crude grid

CALL: from SETUPX

CALL STATEMENT: no arguments

SUBROUTINES CALLED: none

DATA TO COMMON:

EXTER	ZTX
	ETAX(K)
INDEXX	LWNGUX
	LMAXX
	KTIPX
	KTM1X
	KMAXX

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
LM	10
ZMAX	10
Z1	.12
XLM	LM
ZTRM	XLM-.5
BZ	constant in polynomial of Z grid
AZ	2*Z1-.25*BZ
XLL	L
XLL2	XLL-.5
XNW	KTIPX-1
DETA	ETAX(K)-ETAX(K-1)

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE VISCFL

PURPOSE: computes the boundary layer displacement effect

CALL: from MAIN

CALL STATEMENT:

PROGRAM	VARIABLE DESCRIPTION
MAIN	number of last inviscid iteration

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
BAVITZ	cove separation treatment
CLCALC	computes the lift coefficient
CPCALC	determines the pressure distribution
SLOPY	interpolates between grids, calculates slopes of quantities
SMTH	smoothes trailing edge boundary conditions (if desired)
STRIPK	links laminar and turbulent boundary layer programs
SIMP	Simpson's rule integration

DATA TO COMMON:

COMMON	VARIABLE
PARM	BLDL
	WCOE
WING	XTEWX
WINGBC	WBCL
	WBCU
VISCOM	CFFKL
	CFFKU
	CFVL
	CFVU
	CFZL
	CFZU
	CLGG
	CPIL
	CPIU
	CPLK1

DATA TO COMMON(cont.)

	CPLK2
	CPUK1
	CPUK2
	DDDSTU
	DDDSTL
	DELLK1
	DELLK2
	DELSL
	DELSU
	DELUK1
	DELUK2
	EPS1X
	EPS2X
	ETAK
	ITEX
	SBRAL
	SBRAU
	SCFB
	SCFT
	VOTHET
LOCAL2	XCBLX
	NNX
	NNXX
SZT	K8BL
	NX
	SEPMIN
	DDDSL
VITERP	DXLSTL
	DXLSTU
	ETAOLD
	K7OLD
	K8OLD
	NXOLD
VSCINP	ISTOP
	IVITER
CPCAL	NGRIDS
VSFCOM	KO

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
BLDLO	lower surface deltastar slope from previous iteration
BLDL	new lower surface deltastar slope
BLDU	new upper surface deltastar slope
BLDUO	upper surface deltastar slope from previous iteration
CFTU	upper surface local skin friction

CFTL	lower surface local skin friction
CFVISC	total viscous drag
CHANGL	fractional change in lower surface deltastar
CHANGU	fractional change in upper surface deltastar
CHISWP	x/c at which effective sweep angle is taken
DELPTE	trailing edge potential jump
DELTCL	change in CL from previous iteration
EML	local lower surface Mach no.
EMU	local upper surface Mach no.
ISTATN	span station at which boundary layer is being calculated
ISURF	=1, upper surface =2, lower surface
ITER	iteration number
IUNIT	output unit
IVCONT	convergence criterion clue
KSMTHX	no. of smoothings performed
KVOMXL	lower surface separation point index
KVOMXU	upper surface separation point index
K2SMTH	no. of smoothings of trailing edge boundary conditions
PJTE	trailing edge potential jump
REL	Reynold's number
SWPANG	local sweep angle
XSEPU	upper surface separation point
XSEPL	lower surface separation point

READ STATEMENTS: none

WRITE STATEMENTS:

IVITER, NGRIDS, CLG, EPS1, EPS2, K, DCPMXL(K), CPNL(K), CPOL(K), JMXL(K), AVCHGL(K), ETA(K), J, XOUT(J), DELSTU(J), CHANGU, BLDU, DDSTU(J), DELSTL(J), CHANGL, BLDL, DDSTL(J), WBCU(K,J), WBCL(K,J)

SUBROUTINE VBRAD

PURPOSE: Bradshaw's boundary layer program with changes incorporated in order to compute the boundary layer over infinite swept wings using Nash's modified chord technique

CALL: from STRIPK

CALL STATEMENT:

ARGUMENT	DESCRIPTION
SBRA	output location vector for solution
VODEL	vector of displacement thickness at SBRA
VOTHET	vector of momentum thickness at SBRA
CFV	vector of skin friction component in direction perpendicular to equivalent infinite swept wing leading edge
CFZ	vector of skin friction component in direction parallel to equivalent infinite swept wing leading edge
CP	input pressure coefficient
I	Bradshaw's I vector **
A	Bradshaw's A vector ++
RE	Reynold's number based on chord
HO	initial shape factor
XLAMDA	cosine of angle between the yawed wing coordinate system and the surface streamline direction
KSEP	separation clue; =+1,no separation; =-1,separation
KVOMX	total number of stations at which boundary layer solution is computed
KVOL	value of subscript at which last laminar solution results are stored

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
FINT	simultaneous triple interpolation
GORD	computes Bradshaw's G function

ORDIN	interpolates for constant spaced data
REDUCX	interpolates to new grid
RLORD	Bradshaw's L function
SIMPSN	Simpson's rule integration
SLOPE	calculates the slope of a tabulated function
SOLVEB	solution of two simultaneous linear algebraic equations
SPRINT	outputs profile results
TANCAL	computes characteristic angles
VNUSUB	computes Nash effective viscosity
FN	(statement function subprogram)
SLOG	(statement function subprogram)

DATA TO COMMON:

COMMON	VARIABLE
REDUC	I61
	TFUT
	UFUT
	V
	WFUT
EXTEND	LASTI
	XCMAX
THRED	XLAM

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
AAT	ALPHA*A(1)/TAUO
AMACH	A(18) ++
AMACN	COS(A(20))*AMACH ++
AY	A(13)*(A(12)-1) ++
AZ	ORDIN(P,A(2),XXSTEP) ++
A162	2*A(16) ++
A8ORIG	A(8) ++
C	B/(A(13)*(B-1)+1) ++
CFR	2*TAUO/RK2/(1+RKS)
CFRIN	CFR*CFFCTR
CFV	XNASH
CFZ	CFZZZ
CFZZZ	
DA	F3+DF3DU*DU
DELTA1	displacement thickness
DELTA2	momentum thickness
DF1DA	-A(1)/A(9)/ROOT*F6 ++
DF2DU	F5*(TOR/(-.5*G)+F4*F7
DIV	divergence of flow factor

MAIN INTERNAL SUBROUTINE VARIABLES(cont.)

DLPDX	pressure gradient term
DTW	-F2-DF2DU*DU-A(1)*DA ++
F	WW*TOR/A(8) ++
F2	TAUO+ALPHA*A(1)+F4*F5 ++
F5	1/(1-UFUT(1)**2/E)
F7	2*UFUT(1)/(E-UFUT(1)**2)
H1	DELTA1/DELTA2
I	Bradshaw's I vector**
IENT	INT(.25+A(6)/A(1))
INNER	inner loop check counter- Newton iteration
IOUTER	outer loop check counter-Newton iteration
IQ	separation klue
ITDFL	=0,2-D flow, =1, 3-D flow
IWRIT	I(15)
I5	I(5)
I6	I(6)
I625	I(6)/4
I7	I(7)
I8	I(8)
I9	I(9)
I11	I(11)
KVO	output station number
KVOMX	KVO, at end of turbulent calculation
KVOL	initial solution station where results have been obtained, from laminar flow
KVXK	KVO+1
L	J
LEDGE	L
LIMIT	I(4)
LXXX	I(6)
P	static pressure
PK	K
POPINF	TOTINF**(A(12)/(A(12)-1))
RETHT	A(4)
RICH	Richardson streamline curvature term
RI5	FLOAT(I5)
RI6	FLOAT(I6)
RKJ	AY*XMNSQ/2
RL	FLOAT(L)
RMA2	RK2/(1-.5*(A(12)-1)*RK2)
RO	RO
ROOT	SQRT(TAUO)
ROOTT	SQRT(TAUO)
SBRA	X
SWPANG	Sweep angle of wing
TANA	TANAFU(J)
TANB	TANBFU(J)
TEST1	DU/UFUT(1)
TEST2	DTW/TAUO

MAIN INTERNAL SUBROUTINE VARIABLES(cont.)

TEST3	DA/ALPHA
TEST4	1-TFUTP/TORO
TOTINF	1+(A(12)-1)/2*AMACN**2
UEDGE1	UFUT(L)
UEDGE2	UFUT(L+1)
VODEL	DELTA1
VOTHET	DELTA2
XFUT	X+XSTEP
XME	SQRT(2*RK5/AY)
XNASH	CFRIN/COS(A(20))**2
XPDX2	X+.5*XSTEP
XSTEP	x direction step size
XXSTEP	X+XSTEP
ZJ	FLOAT(J)
ZK	FLOAT(K)

**Bradshaw's I Vector

I(1)-identifying case number
I(2)-number of steps between output profiles
I(3)-maximum number of solution steps
I(4)-maximum number of calculation points on profile
I(5)-number of evenly spaced input CP's and lamdas
I(6)-number of points on profile (input value is the initial number)
I(7)-curved surface clue,=1, curved surface, =0, flat surface
I(8)-limit for iteration between law of wall and outer solution
I(9)- =0, unless 3-D relief effects are input
I(10)-type of pressure input; =2 for CP input
I(11)-clue for initial profile; =1, internally generated
I(12)-transition clue used in laminar calculation
I(13)-3-D flow simulation clue; =1, 3-D flow; =0, 2-D flow
I(14)-profile output clue
I(15)-output unit clue, print output is on UNIT I(15)

++Bradshaw's A Vector

A(1)-initial momentum thickness (generated in BLLAM)
A(2)-spacing of input pressures and lamdas

A(3)-initial station for turbulent boundary
layer calculation (generated in BLLAM)
A(4)-initial local momentum thickness Reynolds
number (generated in BLLAM)
A(5)-initial H (generated in BLLAM)
A(6)-initial deltastar/c; not required if initial
profiles are generated internally
A(7)-printed profile results if CF<A(7)
A(8)-the value of A1 in the Bradshaw theory
A(9)-K in the log law
A(10)-A in the log law
A(11)-CFL stability criterion factor
A(12)-ratio of specific heats
A(13)-recovery factor
A(14)-exponent in the power law viscosity-
temperature relation
A(15)-t factor in the D term required in the
compressible flow case
A(16)-the error criterion in the wall
iteration calculation
A(17)-CF below which the I(4) limit does
not operate
A(18)-Mach number of the freestream
A(19)-specified transition point; (XTR/C)
A(20)-equivalent sweep angle in radians

READ STATEMENTS: none

WRITE STATEMENTS:

K,X,XNASH,DELTA1,DELTA2,H1,CFZZZ,XME

SUBROUTINE BLLAM

PURPOSE: laminar boundary layer calculation by the method of Rott and Crabtree, which is basically the method of Thwaites extended to compressible flow

CALL: from STRIPK

CALL STATEMENT:

SUBROUTINE	ARGUMENT	DESCRIPTION
STRIPK	SBRA	vector of X positions at which the solution is stored
	VODEL	vector of displacement thickness at SBRA
	VOTHET	vector of momentum thickness at SBRA
	CFV	vector of skin friction component in X-direction at SBRA
	CFZ	vector of skin friction component in Z-direction at SBRA
	CP	input pressure coefficient
	XLAMDA	cosine of streamline angle
	IVI	Bradshaw's I vector
	VA	Bradshaw's A vector
	RE	Reynold's number based on chord
	HO	displacement thickness /momentum thickness at the last laminar flow station
	KSEP	separation clue; =+1,no separation; =-1,separation
	KVOL	total number of stations at which boundary layer solution is computed
	NMAX	number of chordwise stations at which laminar solution is computed

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
ORDIN	linear interpolation
SPLN1	interpolate the Thwaites functions
SPLN1X	interpolate the Thwaites functions
TINT	(statement function subprogram)

DATA TO COMMON:

COMMON	VARIABLE
EXTEND	LASTI
	XCMAX

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
AA	1/120-HINC/945
AAA	.45*TRATO/RE
ACPX	(CPXMAX-CP(1))/XMAX
AMACH	freestream Mach number
AMACN	AMACH*COS(VA(20))
A12	VA(12)
CFV	skin friction
CFZ	estimated spanwise skin friction
CFZFTR	148/325*TAN(VA(20))*TRATX/RE
CHI	transition factor for crossflows
CHORD	VA(2)*(IVI(5)-1)
CP	pressure coefficient
CPX	ACPX*XCPX+CP(1)
CPXMAX	Cp at maximum gradient
DELTA1	H*DELTA2
DELTA2	momentum thickness
DINC	incompressible boundary layer thickness
DS	step size
DSMAX	NMAX
DSTST	VA(19)-S
DSUUE	DS
DTH	boundary layer thickness
D1INC	HINC*D2INC
D2INC	DELTA2*TRAT**POWX
H	TRAT*(HINC+1)-1
FMACH	AMACH*UBARI/QQQ
HINC	incompressible shape factor
HO	H
IWRIT	IVI(15)
I12	IABS(IVI(12))
I5	IVI(5)
KVOL	N
PEPINF	(1+.5*A12*CP(J)*AMACH**2)
PEPO	PEPINF/POPIN
POLFAC	Polhausen polynomial factor
POW	(A12-2)/(A12-1)
POWX	.5*(A12+1)/(1-A12)

MAIN INTERNAL SUBROUTINE VARIABLES(cont.)

POPIN	TERM**(A12/(A12-1)
RD2	Reynolds number based on momentum thickness
RE	RE*COS(VA(20))
S	chord position
TERM	1+(A12-1)/2*AMACN**2
TETIN	temperature, edge to freestream
THETA	(CP(1)-CP(J))/((J-1)*VA(2))
TL	Thwaites tabulated function
TM	Thwaites tabulated function
TMGRD	ORDIN(UBARP,DSUUE,S+DS)
TMO	TM
TRAT	stagnation temperature ratio
TRATO	(1+VAL*AMACH**2)**POW
TRATX	1+VAL*AMACH**2
TWH	Thwaites tabulated function
UBARI	incompressible velocity ratio
UESQ	XMNSQ/AMACN**2*TETIN
VAL	.5*(A12-1)
VODEL	DELTA1
VOTHET	DELTA2
WWE	ACOS(XLLE)
XCP	location of pressure input
XCPX	(J-1)*VA(2)
XLLE	ORDIN(XLAMDA,VA(2),S+DS)
XLLL	XLAMDA
XMNSQ	Mach number squared
XOMEGA	ATAN(TAN(VA(20))/URR(J))

READ STATEMENTS: none

WRITE STATEMENTS:

S,TM,DELTA1,DELTA2,DTH,RD2,CPV,H,CFZ,CHI,UBARI,PMACH
VA(1),VA(4),VA(5),H

SUBROUTINE STRIPK

PURPOSE: combines the laminar and turbulent modified chordwise boundary layer programs

CALL: from VISCFL

CALL STATEMENT:

SUBROUTINE	ARGUMENT	DESCRIPTION
VISCFL	CP	input pressure coefficient
	RX	Reynolds number - streamwise velocity, but yawed wing chord
	SBRA	output vector containing the location of the solution
	VODEL	displacement thickness
	VOTHET	momentum thickness
	CFV	vector of skin friction component in X-direction at SBRA
	CFZ	vector of skin friction component in Z-direction at SBRA
	KVOMX	number of arguments in solution vector
	KSEP	separation clue; =+1, no separation, =-1,separation
	KVOL	total number of stations at which boundary layer solution is computed
	NMAX	number of chordwise stations at which laminar solution is computed
	ISTATN	calculation station (minus indicates lower surface)
	ITRANS	transition klue, -4 for specified transition
	IOUTP	=0, no b.l. output, =1,distributions, =2, profiles also
	ISTEPO	steps between profile output
	MACHNO	freestream Mach number
	XTRNS	location of specified transition location
	SWPANG	sweep angle
	IUNIT	unit on which results are written

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
BLLAM	for laminar calculation
VBRAD	for turbulent calculation

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS:

I1, J, I(J), J1, I(J1), J2, I(J2), A(J), A(J1), RE, SWPANX

SUBROUTINE FINT

PURPOSE: simultaneous triple interpolation

CALL: from VBRAD

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
A	C1*U(J) +C2*U(J+1) +C3*U(J-1)
B	C1*T(J) +C2*T(J+1) +C3*T(J-1)
C	C1*W(J) +C2*W(J+1) +C3*W(J-1)
C1	1-R**2
C2	.5*(R**2+R)
C3	.5*(R**2-R)

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE GORD

PURPOSE: compute Bradshaw's G function

CALL: from VBRAD, TANCAL

CALL STATEMENT:

SUBROUTINE	ARGUMENT
VBRAD	RR
TANCAL	AAJ

SUBROUTINES CALLED: none

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

FUNCTION PFINT

PURPOSE: function subprogram to interpolate PHI from the coarse grid to the fine grid

CALL: from FARBDY

CALL STATEMENT:

ARGUMENT	DESCRIPTION
J1	coarse grid J index upstream of fine grid point
J2	coarse grid J index downstream of fine grid point
K1	coarse grid K index inboard of fine grid point
K2	coarse grid K index outboard of fine grid point
L1	coarse grid L index below the fine grid point
L2	coarse grid L index above the fine grid point
DX	X-fraction from coarse grid point to fine grid point
DY	Y-fraction
DZ	Z-fraction

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
PFINT	interpolated value of PC

READ STATEMENTS: none

WRITE STATEMENTS: none

FUNCTION GRAD

PURPOSE: slope of a function at its tabulated pts.

CALL: from SLOPE

CALL STATEMENT:

ARGUMENT	DESCRIPTION
FR	tabulated function
H	distance between points of FN
IA	lower limit of table
IB	upper limit of table
N	location at which slope is desired

SUBROUTINES CALLED: none

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

FUNCTION ORDIN

PURPOSE: linear interpolation for constant spaced data

CALL: from VBRAD, BLLAM

CALL STATEMENT:

ARGUMENT	DESCRIPTION
A	tabulated fundtion
G	step size of tabulated data
X	location of desired function value

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
AINT	(inline function)
INT	(inline function)

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

FUNCTION BLOBD

PURPOSE: Bradshaw's L function

CALL: from VBRAD

CALL STATEMENT:

SUBROUTINE	ARGUMENT
VBRAD	RR

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
EXP	(in library)
SQRT	(in library)

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

FUNCTION SIMPSN

PURPOSE: Simpson's rule integration

CALL: from VBRAD

CALL STATEMENT:

ARGUMENT	DESCRIPTION
FR	function to be integrated
IA	lower limit of integration
N	upper limit of integration
H	spacing between FR s

SUBROUTINES CALLED: none

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

FUNCTION SLOPE

PURPOSE: to calculate the slope of a tabulated function at an arbitrary pt.

CALL: from VBRAD

CALL STATEMENT:

ARGUMENT	DESCRIPTION
A	the tabulated function
G	the spacing of A
N	the number of A's
X	the location at which the slope is desired

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
GRAD	slope of a function at its tabulated pts.
AINT	(inline function)
INT	(inline function)

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SOLVEB

PURPOSE: solution of two simultaneous linear algebraic equations

CALL: from VBRAD

CALL STATEMENT:

ARGUMENT	DESCRIPTION
D	1st solution value
E	2nd solution value
DET	determinate
A	matrix contining all coefficients

SUBROUTINES CALLED: none

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SPRINT

PURPOSE: output of profile results

CALL: from VBRAD

READ STATEMENTS: none

WRITE STATEMENTS:

X, A(1), CRF, RK, DELTA2, THETA, H1, DELTA1,
DLPDX, VDLPX, J, UK(J), RM2(J), TAUK2(J), VK(J),
TANA(J), TANB(J)

SUBROUTINE TANCAL

PURPOSE: computes the characteristic angles for use in the solution

see Eqn. 21 of Bradsahaw and Ferris for details

CALL: from VBRAD

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
GORD	computes Bradshaw's G function

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE VNUSUB

PURPOSE: computes the Nash effective viscosity

CALL: from VBRAD

CALL STATEMENT:

ARGUMENT	DESCRIPTION
RETHET	Reynolds number based on momentum thickness
XLAMDA	angle between streamline and yawed wing X
VNUEFR	effective viscosity ratio
XMESQ	square of the Mach number

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
ALOG10	(in library)
SQRT	(in library)

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE REDUCX

PURPOSE: to interpolate to new grid

CALL: from VBRAD

CALL STATEMENT:

ARGUMENT	DESCRIPTION
IN	=1, grid spread out, =2, grid contracts
A	Bradshaw A vector
I	Bradshaw I vector

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
ALOG	(in library)
FLOAT	(inline function)
INT	(inline function)

DATA TO COMMON:

COMMON	VARIABLE
REDUC	I61
	TANAFU
	TANBFU
	TFUT
	UFUT
	V
	WFUT

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE VTRANS

PURPOSE: interpolates the boundary layer displacement thickness and CP's from the old solution grid to the new grid

CALL: from IC

CALL STATEMENT:

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SLOPY	interpolates deltastars and CP's from old chordwise grid (NXO(K)) to new chordwise grid (NX(K))
SMTH	smooths interpolated deltastars (if desired)
FLIN	FLIN(R,T,ETA,YR,YT) = (ETA-YR)/(YT-YR)*(T-R)+R interpolates from old spanwise grid to new spanwise grid

DATA TO COMMON:

COMMON	VARIABLE
WINGBC	WBCL
	WBCU
VTRAN2	DELDN
	DELUP
	XOUT

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
NXOLD	no. of chordwise points from previous solution at inboard span station of pair used for spanwise interpolation
NXOLD1	no. of chordwise points from previous solution at outboard

	span station of pair used for spanwise interpolation
NX	no. of chordwise points in new grid
XOUTOD	values of XOUT from old solution
DDDSUI	upper surface deltastar slope from previous solution at inboard span station
DDDSLI	lower surface deltastar slope from previous solution at inboard span station
DU	upper surface deltastar slope interpolated to new chord-wise grid
DL	lower surface deltastar slope interpolated to new chord-wise grid
DDDSUO	upper surface deltastar slope from previous solution at outboard span station
DDDSLO	lower surface deltastar slope from previous solution at outboard span station
DU1	upper surface deltastar slope interpolated to new chordwise grid
DL1	lower surface deltastar slope interpolated to new chordwise grid
DSLU	upper surface deltastar slope interpolated to new spanwise grid
DSLL	lower surface deltastar slope interpolated to new spanwise grid
CPUI	upper surface CP from previous solution at inboard span sta.
CPLI	lower surface CP from previous solution at inboard span sta.
CPUO	upper surface CP from previous solution at outboard span sta.
CPLO	lower surface CP from previous solution at outboard span sta.
CPUIX	upper surface CP's interpolated to new chordwise grid
CPLIX	lower surface CP's interpolated to new chordwise grid
CPUOX	upper surface CP's interpolated to new grid
CPLOX	lower surface CP's interpolated

	to new grid
CPU	upper surface CP's interpolated to new spanwise grid
CPL	lower surface CP's interpolated to new spanwise grid

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE CPCALC

PURPOSE: computes the pressure distribution

CALL: from VISCFL

CALL STATEMENT: no arguments

SUBROUTINES CALLED: none

DATA TO COMMON:

COMMON	VARIABLE
CPCALC	AVCHGL
	AVCHGU
	CMAXDB
	CMAXDT
	CPBBAR
	CPL
	CPNL
	CPNU
	CPOL
	CPOU
	CPTBAR
	CPU
	DCPMXL
	DCPMXU
	EMSQ
	EPS1
	EPS2
	JMXL
	JMXU
	MACHDN
	MACHUP
	NGRIDS
	SHKPB
	SHKPU
	SONPL
	SONPU

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
CPLKJ	new lower surface CP

MAIN INTERNAL SUBROUTINE VARIABLES(cont.)

CPODL	lower surface CP from previous iteration
CPODU	upper surface CP from previous iteration
CPUKJ	new upper surface CP
EML	new local lower surface Mach number
EMU	new local upper surface Mach number
EMLP	local lower surface Mach number from previous iteration
EMUP	local upper surface Mach number from previous iteration
PERDXL	difference in lower surface CP from previous iteration to current iteration
PERDXU	difference in upper surface CP from previous iteration to current iteration
XMPTS	no. of points on each surface

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE CLCALC

PURPOSE: to compute the wing lift coefficient

CALL: from VISCFL

CALL STATEMENT:

SUBROUTINE	ARGUMENT	DESCRIPTION
VISCFL	CLG	lift coefficient

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SIMP	Simpson's rule integration of trailing edge potential jump to yield total wing load

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
CLG	lift from integration of trailing edge potential jump
XLOAD	total wing load from integration of trailing edge potential jump
PJTE	trailing edge potential jump

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE BAVITZ

PURPOSE: treatment of lower surface separation zone using methods of Paul C. Bavitz, NASA TN D-7718
This routine is used only if the foil being analyzed is supercritical.

CALL: from VISCFL

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
VINTER	general Lagrangian interpolation

DATA TO COMMON:

COMMON	VARIABLE
WINGBC	WBCL
BAVCOM	CPL2
	DXLSTL
	DST2
	XSEP
	YSEP
SZT	DDDSL

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
XSEP	x/c's chosen for Bavitz treatment
YSEP	deltastars at XSEP
ST2	modified displacement thickness
DST2	modified deltastar slope
WBCL	modified lower surface boundary condition

READ STATEMENTS: none

WRITE STATEMENTS:

J, XOUT(J), DST2(J(, ST2(J), DDSL(K,J), WBCL(K,J), WBCLOR(K,J)

SUBROUTINE VINTER

PURPOSE: general Lagrangian interpolation

CALL: from BAVITZ,DATTRN,BLOUT

CALL STATEMENT:

ARGUMENT	DESCRIPTION
FN	output vector of function or slope
X	location of FN
KO	1st index value used in FN array
KMAX	last index value used in FN array
VF	input function value
S	location of input function value
IO	1st index value of VF used for interpolation
IMAX	last index value of VF used for interpolation
LF	order of interpolation =2-linear =4-cubic etc.
IDER	=0 function value returned >0 slope of function returned

SUBROUTINES CALLED: none

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SLOPQ

PURPOSE: interpolation

NOTE- *This routine exists in CDC version only and is used to overcome LEVEL difficulties its operation is identical to SLOPY*

CALL: from GEOMBR, GEOBRX, BLLAM

CALL STATEMENT: see SLOPY description for details

SUBROUTINE BLOUT

PURPOSE: creates data set for input to the Nash-Scruggs 3-D boundary layer program

CALL: from OUTP

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
VINTER	interpolation to constant x/c spacing

DATA TO COMMON:

COMMON	VARIABLE
NSBL	ZOCL
	ZOCU
	CPL
	CPU
	XOUTA
WING	SWEEP

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
AMACN	MACHNO*COS(SWEEP)
TERM	1+(GAMMA-1)/2*AMACN**2
POPIN	TERM**(GAMMA/(GAMMA-1))
CPSP	(POPIN-1)/(GAMMA/2*MACHNO**2)
THETA	(CPSP-CPU(K,J))/X
ZLE	local leading edge Z-coordinate from subroutine WINGCO through common NSBL
XLE	streamwise location of local leading edge from subroutine SETUP to common WING
XLEWP	local leading edge sweep from subroutine SETUP through common WING
KSMALL	span location index for smallest number of chordwise pts.
NPTSMN	minimum number of chordwise pts.

MAIN INTERNAL SUBROUTINE VARIABLES(cont.)

AMACN	Mach number normal to local leading edge
CPSP	stagnation pressure based on local sweep
THETA	pressure coefficient gradient or local wing twist in degrees
THTMXU	maximum upper surface pressure coefficient gradient
CPMAX	maximum pressure coefficient based on gradient limit
THTMXL	maximum lower surface pressure coefficient gradient
XMAXU	maximum streamwise chord fraction for upper surface pressure coefficient gradient limit
ETA	spanwise location from subroutine SETUP through common INTER
XMAXL	maximum streamwise chord fraction for lower surface pressure coefficient gradient limit
CORDW	local chord length
KSTA	number of spanwise stations
NPTS	number of streamwise pts. along chord
IBOUT	device number for boundary layer data output
NZ	number of mesh pts normal to chord
NCASE	number of cases in input data
NBCO	boundary condition option index
MACHNO	Mach number
SCALE	length scale
PRES	free stream reference pressure
TEMP	free stream reference temperature
LTRN	transition location
NWRITE	write-to-file index
NREAD	read-from-file index
CONV	convergence tolerence

READ STATEMENTS: none

WRITE STATEMENTS:

UNIT IBOUT - TITLE, NPTS, NZ, KSTA, IT, NBCO, IOITER, IOPRF, XLEW(K), ZLE(K), ETA(K), CORDW(K), THETA, XOCLE, XOUTA, ZOCLE, ZOCU, MACHNO, ANGLEW, SCALE, PRES, TEMP, IA19, NWRITE, NREAD, IPUNCH, KSMTH, CONV, CRTLAM, CRTTBL, CPSP(K), CPU, CPL

SUBROUTINE DATTRN

PURPOSE: to transfer from a set of points to another and get the slope at the new point

if input variable is outside range of input independent variable, routine returns zero slope and the value of the function at the apprpriate end point

CALL:

CALL STATEMENT:

ARGUMENT	DESCRITION
NIN	number of input points
XIN	input point locations
YIN	function value at the input points
NOUT	number of output points
XOUT	location of output points
YOUT	function values at the output points
YPOUT	slope of the function at the output points

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
VINTER	general Langrangian interpolation

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE ELIPSE

PURPOSE: to fit an upper and lower ellipse through the input cross-section definition and determine the intersection point on the ellipse and the direction cosines for a given point on the boundary condidtion support surface

CALL: from QUIK

CALL STATEMENT:

ARGUMENT	DESCRIPTION
J	downstream computation plane
YBRICK	input point on BCSS
ZBRICK	z input point on the BCSS
YELIPS	y ordinate of the point on the ellipse
ZELIPS	z ordinate of the point on the ellipse
FNX	streamwise slope of the ellipse at this point (YELIPS,ZELIPS)
FNY	y direction cosine at ellipse point
FNZ	z direction cosine at ellipse point

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
ZC	center of body
FNX	X-direction cosine later redefined to be the steamwise slope
FNY	Y-direction cosine
FNZ	Z-direction cosine
YELIPS	Y-coordinate of intersection
ZELIPS	Z-coordinate of intersection
ZSWT	LINE*YRB+ZC used to test whether on upper or lower ellipse at this point
ZTEST	ALINE*YRB+ZC

AQUAD	1+AA2*AA1 "a" in the quadratic equation for the intersection
BQUAD	-2*(ZMHBI(J)-AA1*AA2*ZC) "b" in the quadratic equation
CQUAD	"c" in the quadratic equation
DETERM	SQRT(BQUAD**2-4*AQUAD*CQUAD)
ZEL1	(-BQUAD +DETERM)/2/AQUAD
ZQP	ZUCLIP(J)
FNORM	SQRT(FX**2+FY**2+FZ**2)

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE QUIK

PURPOSE: generates slopes from simple body input

CALL: from GEOMBR

CALL STATEMENT: no arguments

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
DATTRN	for transfer from one set of points to another
ELIPS	to obtain point and slope from the elliptical crossection at the j plane

DATA TO COMMON:

COMMON	VARIABLE
BODV1	NRBU
	NRBL
	XRBU
	XRBL
	Y
BODV3	RBCU
	RBCL
	FY
BODV4	ZLCLI
	ZMHBI
	YMHBI
	ZLCLIP
	ZMHBIP
	YMHBIP
BODYBC	IBLD
	IBUD
	NRBS
	IBSIDE
	XRBS
	ETABU
	ETABL
	ZBOD

MAIN INTERNAL SUBROUTINE VARIABLES:

MAIN INTERNAL SUBROUTINE VARIABLES(cont.)

VARIABLE	DESCRIPTION
SBRICK	YRB*(ZRBU-ZRBL)
BB	ZMHBI(J)-ZLCLI(J)
SAREL	.25*PI*A*(B+BB)
SALPH	SAREL/SBRICK
DCBU	arc length ratio on top
DCBL	arc length ratio on bottom
KBSM1	KBS-1
DCBS	arc length ratio on side
ZMID	(ZUCLI(J)+ZLCLI(J))/2

READ STATEMENTS: none

WRITE STATEMENTS:

J, XIN(J), SAREL, SALPH(J)

SUBROUTINE QUIKX

PURPOSE: this routine is identical to QUIK, except that the information is provided on the coarse grid

CALL: from GEOBRX

CALL STATEMENT: no arguments

DATA TO COMMON:

COMMON	VARIABLE
BODV1	NRBU
	NRBL
	XRBU
	XRBL
	Y
BODV3	RBCU
	RBCL
	FY
BODV4	ZLCLI
	ZUCLI
	ZLCLIP
	ZUCLIP
	ZMHBI
	ZMHBIP
	YMHBI
	YMHBIP
BODYBC	IBLD
	IBUD
	NRBS
	IBSIDE
	XRBS
	ETABU
	ETABL
	ZBOD

MAIN INTERNAL VARIABLES: same as QUIK

READ STATEMENTS: none

WRITE STATEMENTS:

J,XINX,SAREL,SALPHX

SUBROUTINE MURMAN

PURPOSE: calculates the shock induced jump in vertical velocity and modifies the wing boundary conditions accordingly

CALL: from SOLVE

CALL STATEMENT:

ARGUMENT	DESCRIPTION
IT	current value of ITERP
XSHKP	2-d array of upper and lower shock locations

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
POUT	prints the UMK, V, FMU and W arrays
BUMP	function statement for (1.-x)**2

DATA TO COMMON:

COMMON	VARIABLE
MUREXT	W
	XOLD
WINGBC	WBCU
	WBCL

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
DX	x/c range downstream of shock for modified boundary conditions; set to .1
COEF	alternately lower and upper surface wing boundary condition coefficient
W2	square of shock induced jump in vertical velocity
TS	square root of W2 if W2 > 0; otherwise set to 0.
W2	
XS	relaxed and shifted shock location
XX	(XI(J)-XS)/DX

WBC lower and upper surface wing boundary conditions; equivalenced to WBCL and WBCU

READ STATEMENTS: none

WRITE STATEMENTS:

IT, WORD(L)

SUBROUTINE POUT

PURPOSE: to print a 2-d array VAK(K,J) in blocks of 10 across the page

CALL: from MURMAN

CALL STATEMENT:

ARGUMENT	DESCRIPTION
VAR	dummy 2-d array
NK1	starting value of K
NK2	final value of K
NJ1	starting value of J
NJ2	final value of J
ITYPE	= 0, format = 10E12.4

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES: none

READ STATEMENTS: none

WRITE STATEMENTS:

VAR(K,J)

FUNCTION XLDX

PURPOSE: integration of PJUMP at the t.e. to obtain the lift coefficient

CALL: from SOLVE,OUTP

CALL STATEMENT:

ARGUMENT	DESCRIPTION
KLAST	limit of integration

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SIMP	Simpson's rule integration

DATA TO COMMON: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SAVSOL

PURPOSE: to write the viscous and/or inviscid solution data on Tape 11

CALL: from MAIN

CALL STATEMENT:

SUBROUTINES CALLED: none

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
N	
NX	JTE(K)-JLE(K)+1

READ STATEMENTS: none

WRITE STATEMENTS:

UNIT 11 - TITLE, KWRITE, ITER, JMAX, KMAX, LMAX, LWINGU, KTIP, XI(J), ETA(K), ZT(L), JNOSE, JTAIL, LBU(K,J), LBD(K,J), PJUMP, PF(L,K,J), JMAXX, KMAXX, LMAXX, LWNGUX, KTIPX, XIEX(J), ETAX(K), ZTX(L), JNOSEX, JTAILX, LBUX(K,J), LBDX(K,J), PC(L,K,J), DDDSTU(K,J), DDDSTL(K,J), DXLSTU(K,J), DXLSTL(K,J), CPU(K,J), CPL(K,J)

6. CDC/IBM CONVERSION

The source code has been maintained on the NASA Ames CDC 7600 computer in UPDATE format. The generation of an IBM version of the program is accomplished by using the UPDATE program to change those portions of the CDC code that are not compatible with the IBM compiler. The specific changes required are:

i) The CDC program card is commented out.

ii) The LEVEL 2 statements are deleted since extended core is not available in IBM.

iii) Associated with the absence of extended core in IBM, the PF (fine grid potential field) and PC (coarse grid potential field) arrays are stored in code which requires changes to the code in subroutine INTERP, SOLVE, SOLVEX, DBNDY and DBNDYX. The LEVEL 1 common block PARRY, which stores the data transferred to and from extended core, is eliminated from the program. In subroutine INTERP, local arrays P(20,30,90) and PP(20,20,30) are introduced and equivalenced to PF and PC, respectively. In subroutine SOLVE and DBNDY, local arrays P(20,30,90) are equivalenced to PF. In subroutine SOLVES and DBNDYX, local arrays PP(20,20,30) are equivalenced to PC. In subroutines INTERP, SOLVE and SOLVEX, all calls to READEC and WRITEC are eliminated. In subroutine INTERP, the streamwise interpolation is between planes JO and JO-1 rather than planes 2 and 1. In subroutines SOLVE and SOLVEX, the statement IS = JM2 is deleted and the statement JP1 = IS is replaced by JP1 = JP+1. These statements appear after the completion of the spanwise loop. In subroutine SOLVEX, the potential values at the downstream boundary are explicitly stored; i.e., the statement JP1 = JM1 is replaced by PP(L,K,JP1) = PP(L,K,JM1) in a double do-loop.

iv) In subroutine IC, the test on an end of file on unit 10 is changed to IBM format.

v) In subroutine SPLN1, the ENTRY SPLN1X statement is modified by the addition of the appropriate argument list.

vi) In order to ensure that the viscous program fits into the available SCM on the CDC 7600, common block WING was moved from LEVEL 1 to LEVEL 2. This change required that the arguments of subroutine SLOPY be in LEVEL 2; thus, in turn, required the generation of a LEVEL 1 version of SLOPY, subroutine SLOPQ,

that would perform the same function with LEVEL 1 arguments. In the IBM version, common block WING is in core so that references to SLOPQ are changed to SLOPY. These changes are in subroutines GEOMBR, GEOBRX, WINGCO and BLLAM.

vii) While not required for IBM compatibility, the writing of plot data on unit 12 in subroutine OUTP has been eliminated in the IBM version and replaced by a call to subroutine GRAPH, which has been inserted after the call to subroutine FORCE. A dummy version of subroutine GRAPH has been appended to the IBM version of the program.

7. GRAPHICS PACKAGE

In general, three-dimensional programs produce an immense amount of information. Graphical output is required in order to make an initial inspection of the solution to determine if it appears that a reasonable result has been obtained, as well as to simplify the detailed analysis of the solution. Without a graphical output, local anomalies in the result can easily go undetected due to the volume of output generated. Although there is no question concerning the value of graphics output, the inclusion of graphics in a code intended for general use causes some difficulties because the graphics routines are usually installation dependent. In this program, we have chosen to provide a graphics package that uses standard CALCOMP routines. Users that do not have these routines at their installation can use the routines presented here as examples for creating their own versions of the graphics package. For initial use of the code without graphics, GRAPH3 can be included as a dummy routine.

The information that has been selected for plotting consists of:

i) Geometry verification
ii) Streamwise Cp plots at each span station on the wing
iii) Isobar plots
iv) 3-D Cp plots
v) Spanwise distribution of forces and moments
vi) Displacement thickness distribution at each span station on the wing

In this section, we describe the routines used in the graphics package and include an example of the package operation. These routines were developed on a GOULD plotter, which uses an electrostatic print technique. For pen plotters such as CALCOMP, the isogram routine TRIISO may require excessive pen commands, in which case, it will be necessary to replace the routine with the equivalent routine in use at the particular site.

The results package consists of one controlling program (GRAPH3) and four basic subroutines, one for each element of the plot package. GEOMVR is the geometry verification program and produces a plot of the planform, airfoils and input airfoil slopes. This routine is called before the solution is started and allows the user to spot poor airfoil input and any errors in the planform. CPPLOT produces Cp plots in the standard format for ease of comparison with experimental data. Tick marks are produced in order to allow for cutting pages to $8\frac{1}{2}$X11. The exact isentropic value of Cp* is marked by a horizontal bar on

the vertical axis. Isobars are generated by subroutine TRIISO, which is a general contour plot routine. TRIISO is a refined and extended version of References 7 and 8. The isogram program operates by a linear interpolation method in each "cell" so that occasional wiggles appear due to the logic associated with the interpolation. As presently set up, the contours are arbitrarily assigned in order to provide good coverage for visual inspection. If specific contour lines are desired, GRAPH3 can be altered very simply to choose selected contour line values. Subroutine SPNPLT is used to plot the spanwise variation of the spanload, moment distribution, pressure drag, and local lift coefficient. If the viscous interaction effects are computed, GRAPH3 calls DSTPLT in order to plot δ^*/C at each span station. This amount of information is required in order to assess the full transonic solution. A description of the graphic subroutines and sample output follows. Figure 12 contains a flowchart for GRAPH3 and Figure 13 provides samples after various plots that are generated.

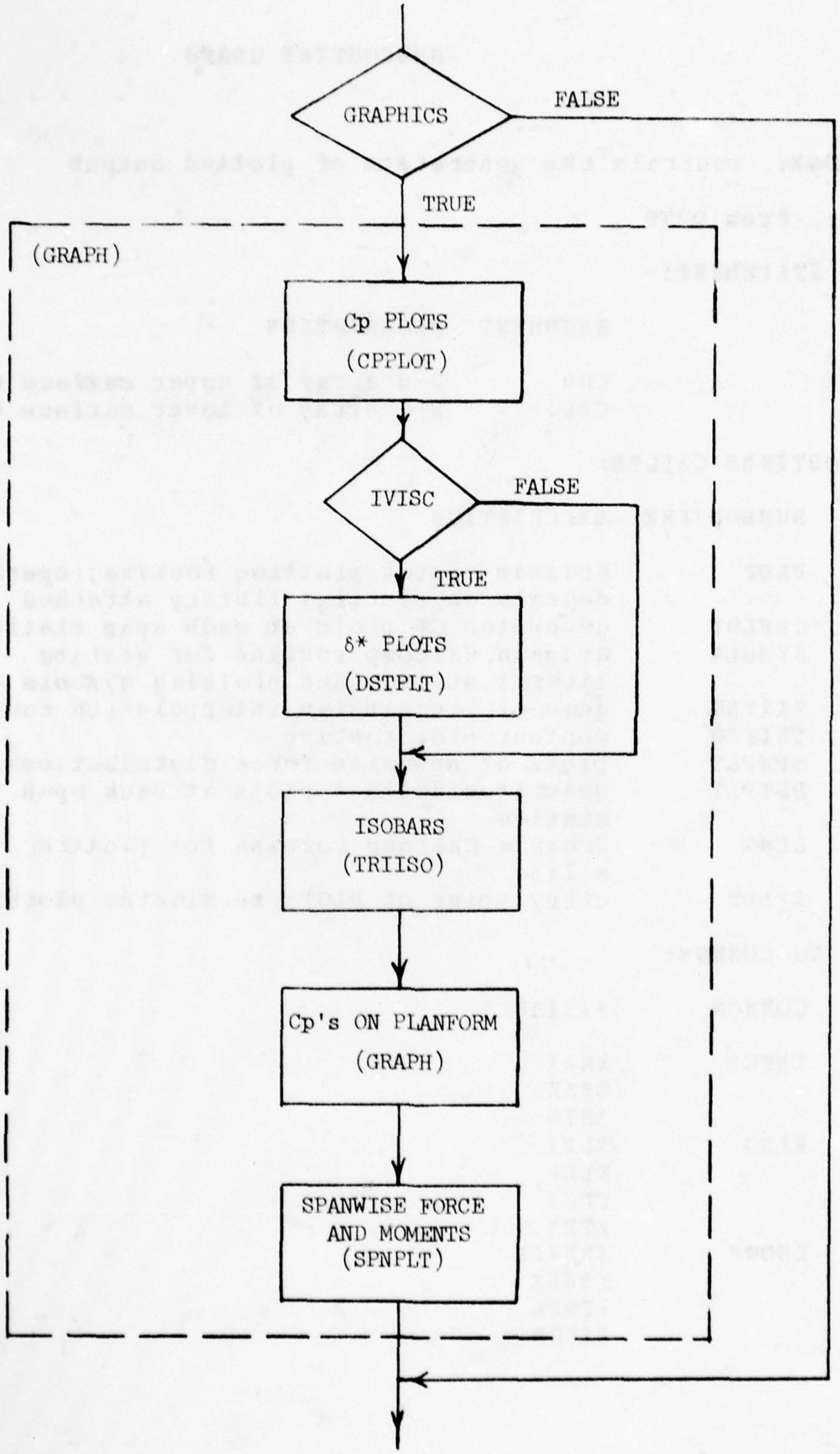


Figure 12. Graphics Program Flowchart

SUBROUTINE GRAPH

PURPOSE: controls the generation of plotted output

CALL: from OUTP

CALL STATEMENT:

ARGUMENT	DESCRIPTION
CPU	2-d array of upper surface CP's
CPL	2-d array of lower surface CP's

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
PLOT	Grumman master plotting routine; operation depends on plotting library attached
CPPLOT	generates CP plots at each span station
SYMBL4	Grumman Calcomp routine for writing literal strings and plotting symbols
VINTER	general Langrangian interpolation routine
TRIISO	contour plot routine
SPNPLT	plots of spanwise force distributions
DSTPLT	generates delta * plots at each span station
LINE	Grumman Calcomp routine for plotting a line
EPLOT	entry point of PLOT; terminates plotting

DATA TO COMMON:

COMMON	VARIABLE
INTER	XMAX
	ZMAX
	ZMIN
WING	YLEI
	XLEI
	YTEI
	XTEI
ISOGM	XRANGE
	YBASE
	YTREL
	XINCH

XORG

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
KLUED	determines CP plot mode; = 0, CP plotted as lines; = 1, CP plotted as symbols
ISTR	= 1, indicates planform and mesh coincide; = 0, planform and mesh do not coincide
K8BL	= KTM1 if YAW = F; = KROOT if YAW = T
XPNT	local 2-d array of x/c's covering planform
CPT	local array of upper surface CP's
CPB	local array of lower surface CP's
CC	local chord/average chord
CLL	section lift coefficient
CML	section moment coefficient
CDL	section drag coefficient
FRAC	ETA(K)/YTIP
NNX	number of points in XSTAT array; = 31, if ISTR = 0, = JTE-JLE+1 if ISTR = 1
XSTAT	array of x/c points for TRIISO
YPF	local array of ETA(K)-YBASE
CPSAV	2-d array for storing CP's for planform plot
XNEW	local array of x/c
CPMESH	2-d array of interpolated CP's for TRIISO
NZ	number of level lines for TRIISO
ZCUT	array of equally spaced level line
XP	local array of scaled horizontal variables
YYP	local array of scaled vertical variables
SCALE	rate of x and y per inch

READ and WRITE STATEMENTS:

write on and reads from unit 99 to
emulate CDC ENCODE statement

SUBROUTINE CPPLOT

PURPOSE: to plot the surface pressure distributions at each span station

CALL: from GRAPH

CALL STATEMENT:

ARGUMENT	DESCRIPTION
XX	array of x/c points
CPU	array of upper surface CP's
CPL	array of lower surface CP's
NMAX	number of points
TITLE	literal array used for plot title
FMACH	freestream Mach number
ANGLE	angle of attack
ERROR	final level of convergence
K	span station index
FRAC	fraction of wing semi-span
CLL	section lift coefficient
CML	section moment coefficient
CDL	section drag coefficient
KLUE	=0, draws line; =1, plots symbols KLUE set to 0 in graph

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SYMBL4	Grumman Calcomp routine for writing literal strings and plotting symbols
AXIS	Grumman Calcomp routine for drawing annotated axes
LINE	Grumman Calcomp routine for plotting a line

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
R	local array for storing literal strings
SCALE	rate of x/c per plot inch
DCP	rate of CP per plot inch

YSC	1./DCP
CPMIN	most negative value of CP allowed
CPC	isentropic value of CP sonic
X	local array of scaled x/c's
Y	local array of scaled CP's

READ and WRITE STATEMENTS:

write on and reads from unit 99 to emulate CDC ENCODE statement

SUBROUTINE DSTPLT

PURPOSE: to plot Deltastar/C at each span station

CALL: from GRAPH3

CALL STATEMENT:

ARGUMENT	DESCRIPTION
XX	array of x/c's
DSTART	array of upper surface delta *'s
DSTARB	array of lower surface delta *'s
NMAX	number of XX points
TITLE	literal array used for plot title
FMACH	freestream Mach number
ANGLE	angle of attack
ERROR	final level of convergence
FRAC	fraction of wing semi-span
K	span station index
NX	number of mesh points along chord
RE	Reynold's number

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
SYMBL4	Grumman Calcomp routine for writing literal strings and plotting symbols
AXIS	Grumman Calcomp routine for drawing annotated axes

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
B	local array for storing literal strings
XMAX	maximum value of XX
XMIN	minimum value of XX
SCALE	rate of x/c per inch
X	local array of scaled x/c's

READ and WRITE STATEMENTS:

write on and reads from unit 99 to
emulate CDC ENCODE statement

SUBROUTINE TRIISO

PURPOSE: to plot upper and lower CP distributions on the planform and to generate planform isobar plots

CALL: from GRAPH3

CALL STATEMENT:

ARGUMENT	DESCRIPTION
CPMESH	2-d array of cp's interpolated to constant x/c's
NX	number of X-stations
NY	number of Y-stations
NZ	number of isobar level lines
ZCUTS	array of level lines for isobars
XM	array of X-points
YM	array of Y-points
SCALE	rate of x and y per inch

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
LINE	Grumman Calcomp routine for drawing lines
PLOT	Grumman master plotting routine; operation depends on plot library attached
SLETE	finds X-coordinate of LE and TE

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
SCALE	rate of X and Y per inch
XP	local X-array for drawing planform and plotting CP's on planform
YYP	local Y-array for drawing planform and plotting CP's on planform
NXP	number of chordwise CP points at each span station
XMESH	local array of X-values which defne cells
YMESH	local array of Y-values which define cells
X	X-coordinates of current isobar cell

Y	Y-coordinates of current isobar cell
Z	values of CP on the cell
XEND	X-array of isobar intersections with cell boundary
YEND	Y-array of isobar intersections with cell boundary
XENDS	XEND array mapped onto planform and scaled for plotting
YENDS	YEND array mapped onto planform and scaled for plotting

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE SPNPLT

PURPOSE: produces plots of the spanwise force distribution

CALL: from GRAPH

CALL STATEMENT:

ARGUMENT	DESCRIPTION
FMACH	freestream Mach number
ANGLE	angle of attack
RE	Reynold's number
ERROR	final level of convergence
ETA	array of spanwise mesh points
KROOT	K index of wing-body junction
KTM1	K index of last span point on wing
TITLE	literal array for plot title
YTIP	Y-coordinate of wing tip

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
LINE	Grumman Calcomp routine for plotting lines
SYMBL4	Grumman Calcomp routine for writing literal strings and plotting symbols
AXIS	Grumman Calcomp routine for drawing annotated axes
PLOT	master plotting routine; operation depends on plotting library attached

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
KTIP	local counter set to KTM1+1
KTOT	number of points between root and tip
SCALE	scaling parameter; .2*YTIP horizontal and .2 vertical
X	local array for storing scaled spanwise coordinates
Y	local array for storing scaled force

MAIN INTERNAL SUBROUTINE VARIABLES(cont.)

coefficients

READ and WRITE STATEMENTS:

write on and reads from unit 99 to
emulate CDC ENCODE statement

SUBROUTINE SLETE

PURPOSE: finds the X-coordinates of the leading edge and trailing edge fcr any span point YVAL

CALL: from TRIISO

CALL STATEMENT:

ARGUMENT	DESCRIPTION
YVAL	input spanwise coordinate
XLEE	X-coordinate of LE at YVAL
XTEE	X-coordinate of TE at YVAL

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
FLIN	statement function for linear interpolation

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES: none

READ STATEMENTS: none

WRITE STATEMENTS: none

SUBROUTINE GEOMVR

PURPOSE: geometry verification routine

CALL: from MAIN

CALL STATEMENT:

ARGUMENT	DESCRIPTION
I1	=1, plot planform; =0, omit
I2	=1, plot input airfoil sections; =0, omit
I3	=1, plot upper and lower wing slopes; =0, omit
I4	=1, plot IBODIN geometry; =0, omit
I5	=1, plot meshes; =0, omit
I6	=1, plot XI=0 and XI=1 on planform; =0, omit
I7	=1, plot B.C. support surface; =0, omit
I8	=1, plot wing twists; =0, omit
I9	=1, plot body slopes; =0, omit
TEST	=STOP, terminate run =GO , continue execution

SUBROUTINES CALLED:

SUBROUTINE	DESCRIPTION
PLOT	Grumman master plotting routine; operation depends on plotting library attached
PLOTS	entry point of plot; initiates plotting
SYMBL4	Grumman Calcomp routine for writing literal strings and plotting symbols
LINE	Grumman Calcomp routine for plotting a line
AXIS	Grumman Calcomp routine for drawing annotated axes

DATA TO COMMON: none

MAIN INTERNAL SUBROUTINE VARIABLES:

VARIABLE	DESCRIPTION
ICALL	=0, first call to GEOMVR; =1, subsequent call to GEOMVR
XP	local array of scaled horizontal variables
YYP	local array of scaled vertical variables
TEMP	local array for mesh dependent data
MESH	=1, initial mesh; =2, interior fine mesh; =3, exterior coarse mesh
XPNT	horizontal coordinate scaled for plotting
YPNT	vertical coordinate scaled for plotting
SCALE	rate of x and/or y per inch
SCALX	rate of x per inch
SCALEY	rate of y per inch

READ and WRITE STATEMENTS:

write on and reads from unit 99 to
emulate CDC ENCODE statement

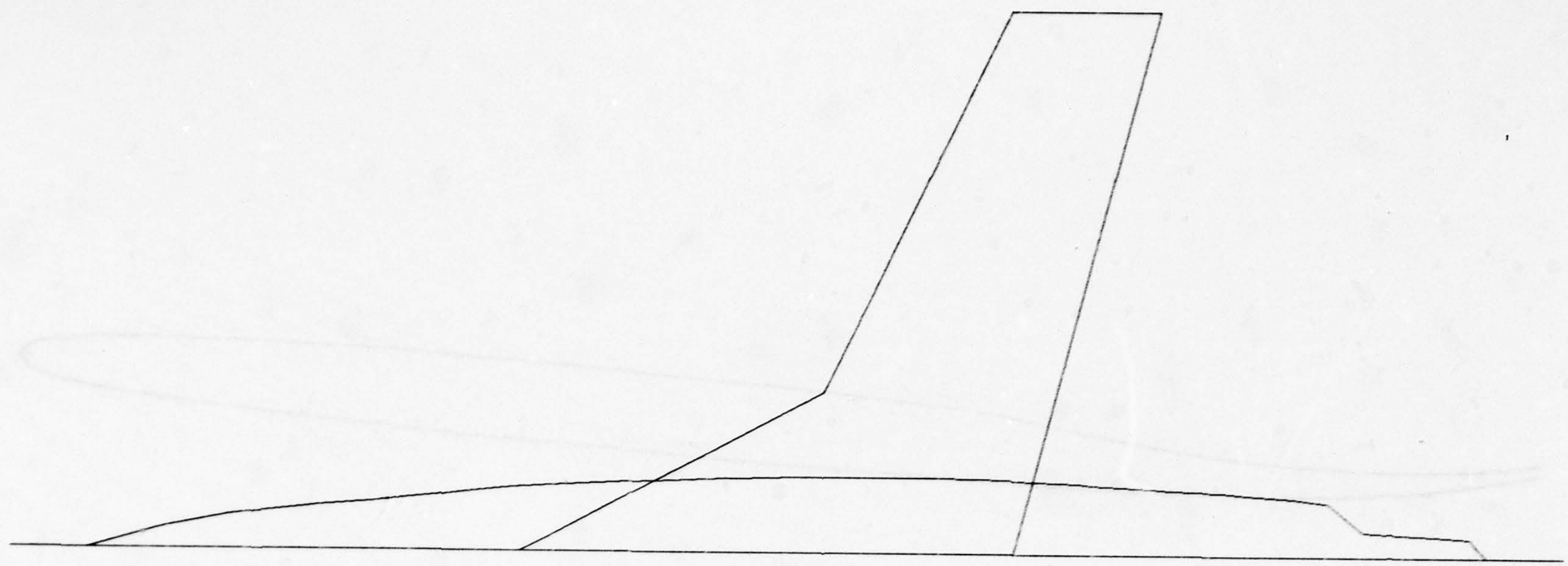


Figure 13a. Sample Geometry Verification - Wing Planform

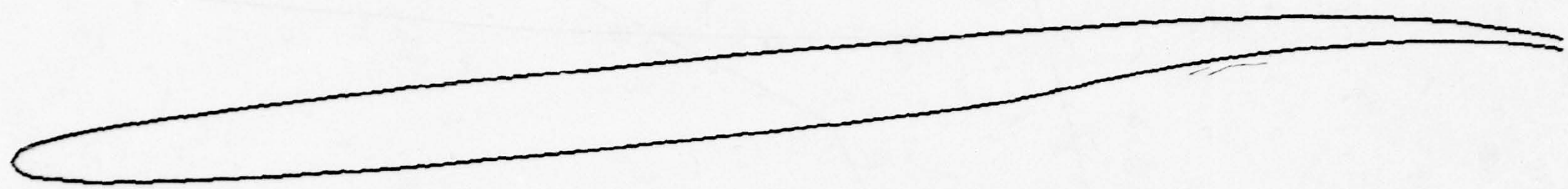
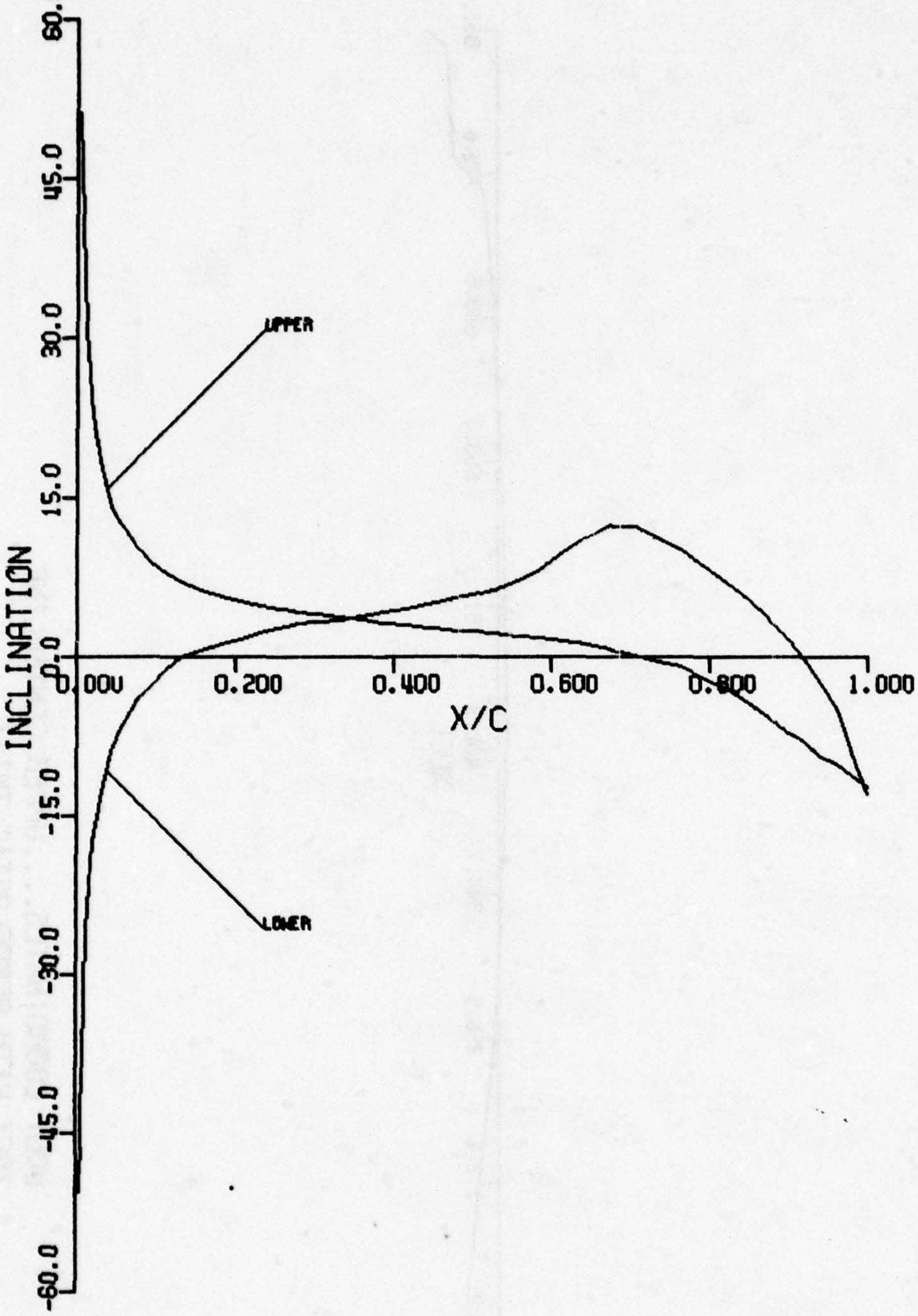
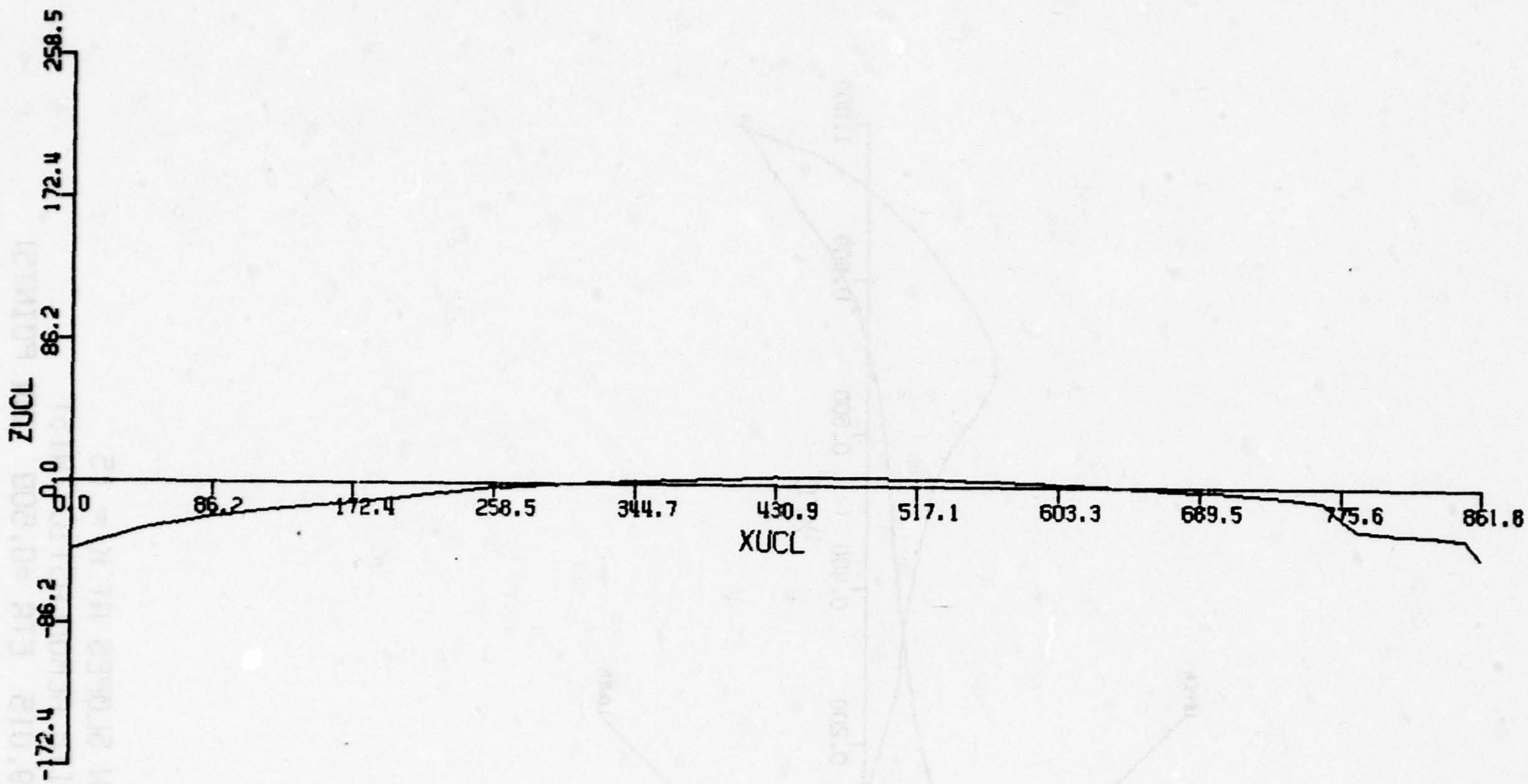


Figure 13b. Sample Geometry Verification - Airfoil Sections



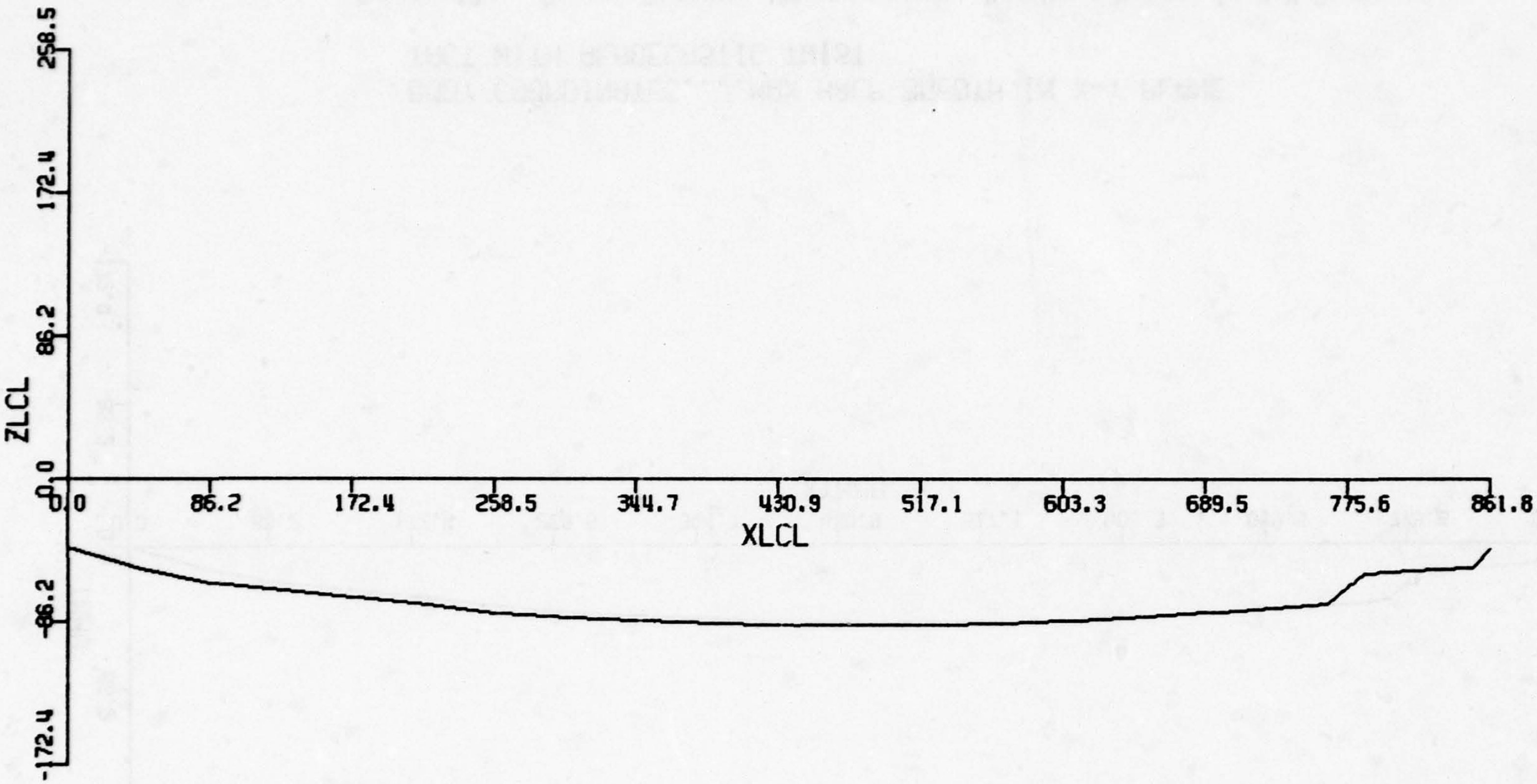
SECTION SLOPES AT K = 15
TACT WITH AEROELASTIC TWIST
Y = 169.015 ETA =0.509 (44 POINTS)

Figure 13c. Sample Geometry Verification - Wing Surface Slopes



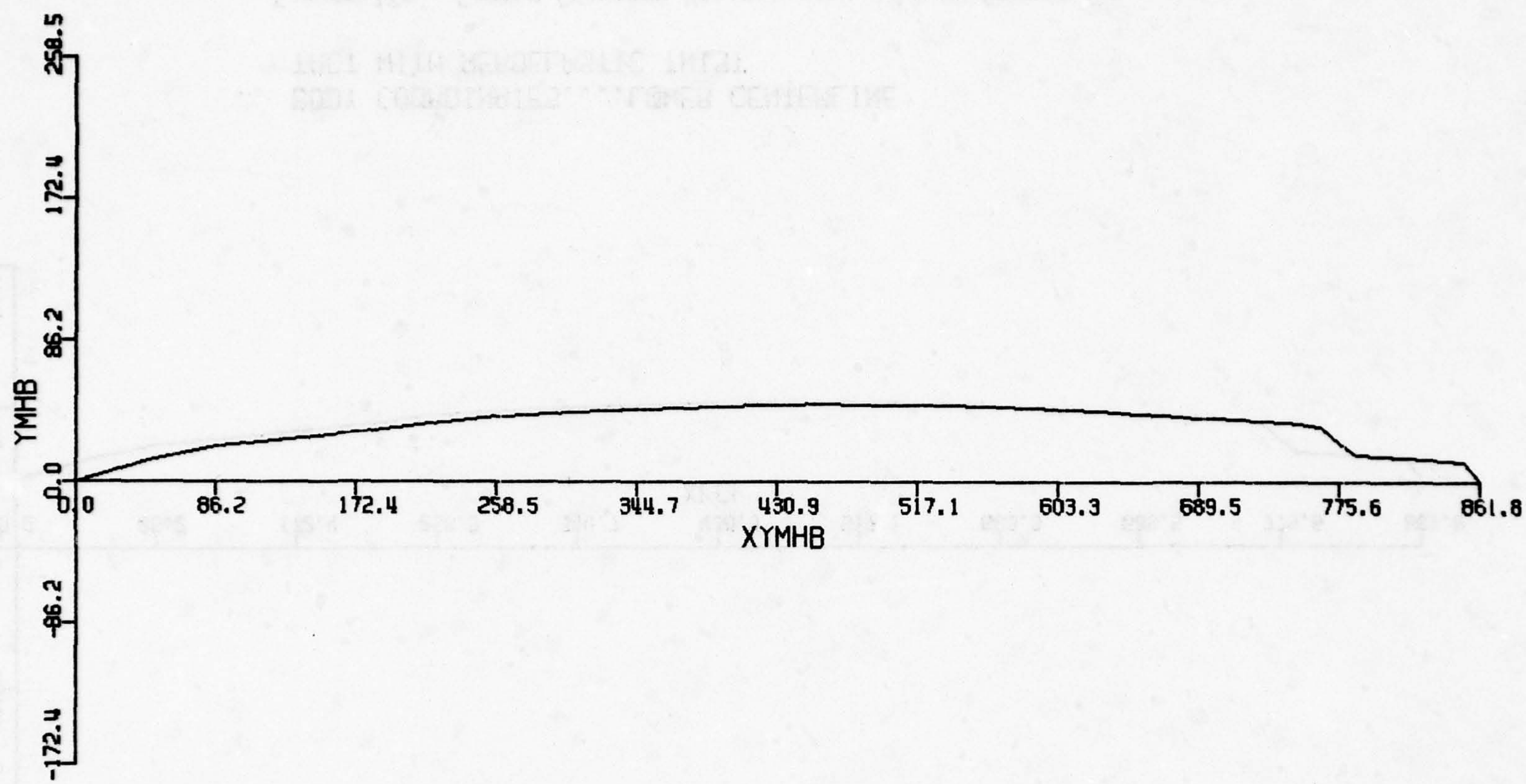
BODY COORDINATES....UPPER CENTERLINE
TACT WITH AEROELASTIC TWIST

FIGURE 13D. SAMPLE GEOMETRY VERIFICATION - UPPER CENTERLINE



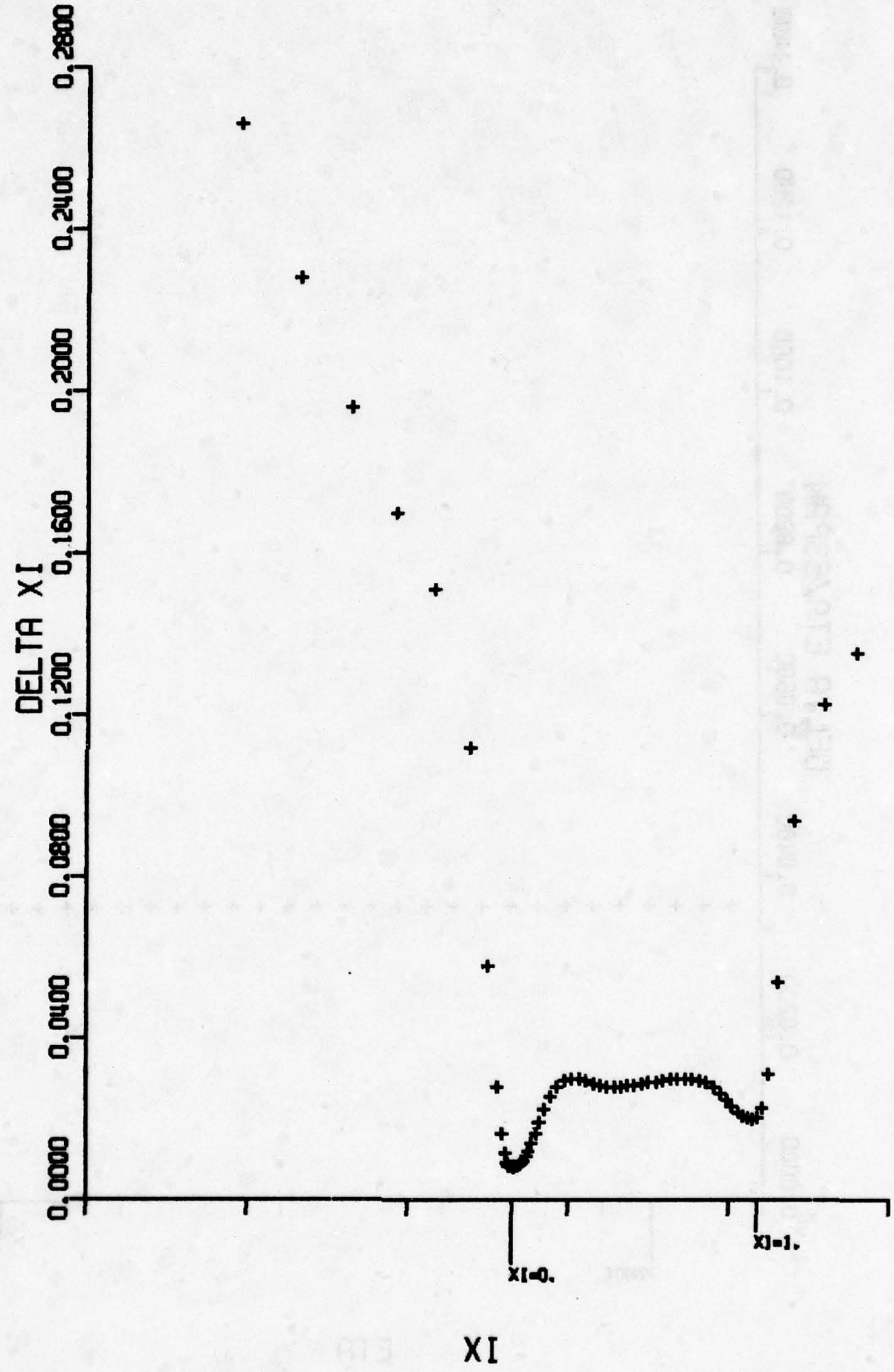
BODY COORDINATES....LOWER CENTERLINE
TACT WITH AEROELASTIC TWIST

FIGURE 13E. SAMPLE GEOMETRY VERIFICATION - LOWER CENTERLINE



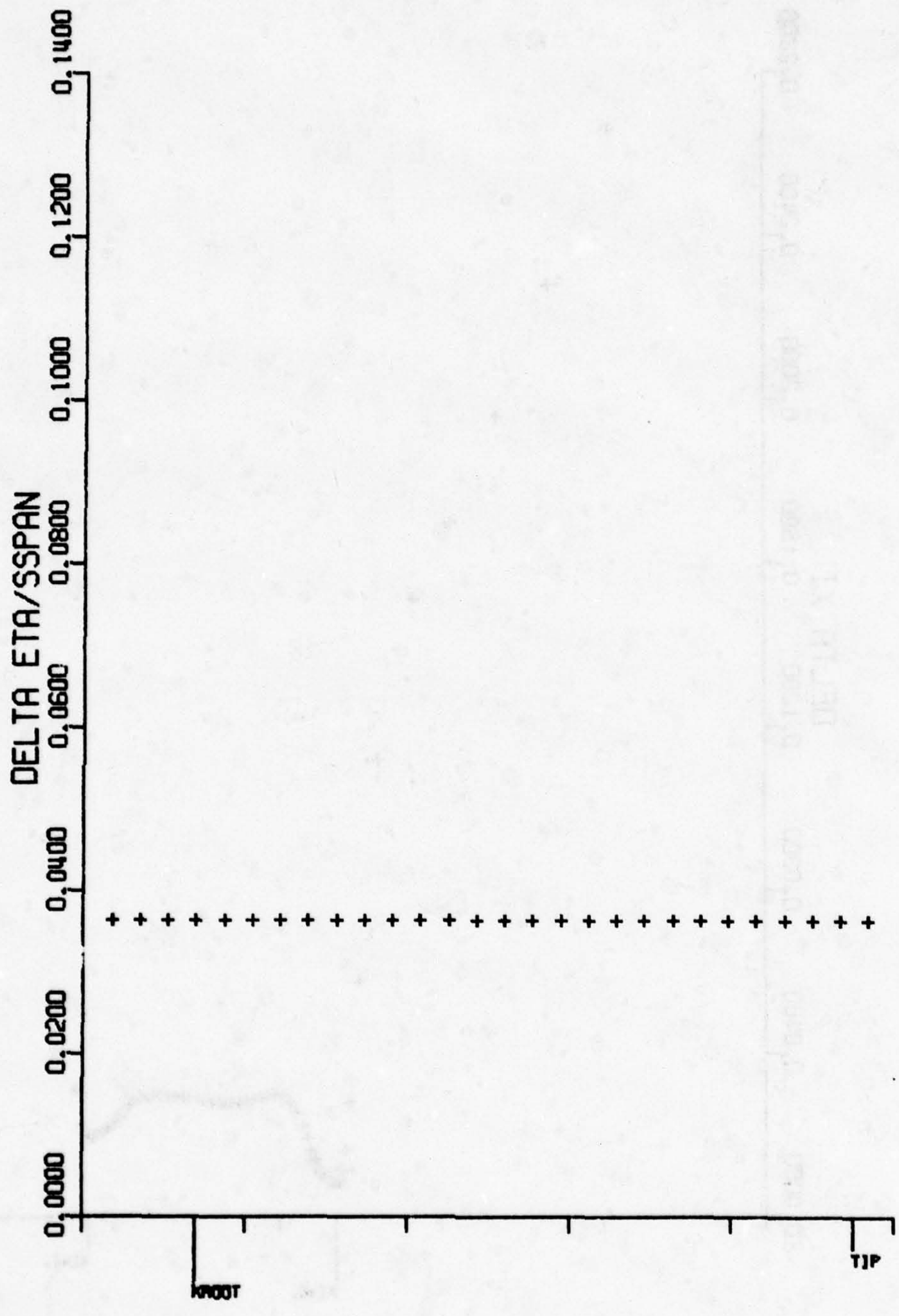
BODY COORDINATES....MAX HALF-BREDTH IN X-Y PLANE
TACT WITH AEROELASTIC TWIST

FIGURE 13F. SAMPLE GEOMETRY VERIFICATION - MAX HALF BREDTH IN X-Y PLANE



XI GRID DISTRIBUTION (INTERIOR MESH)
F-8 CASE

Figure 13g. Sample Geometry Verification - XI-Grid On Interior Mesh



ETA GRID DISTRIBUTION (INTERIOR MESH)
F-8 CASE

Figure 13h. Sample Geometry Verification - ETA-Grid On Interior Mesh

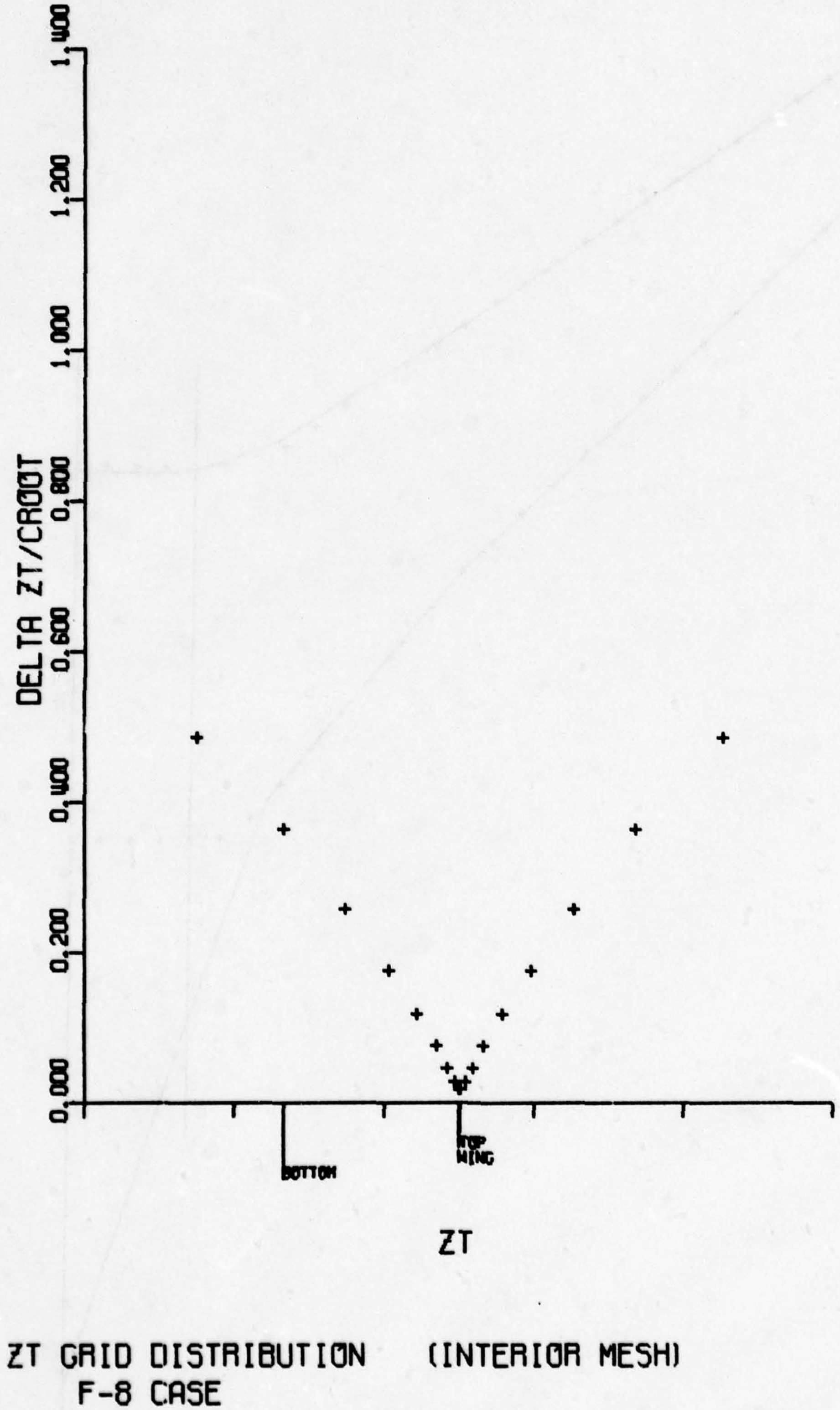
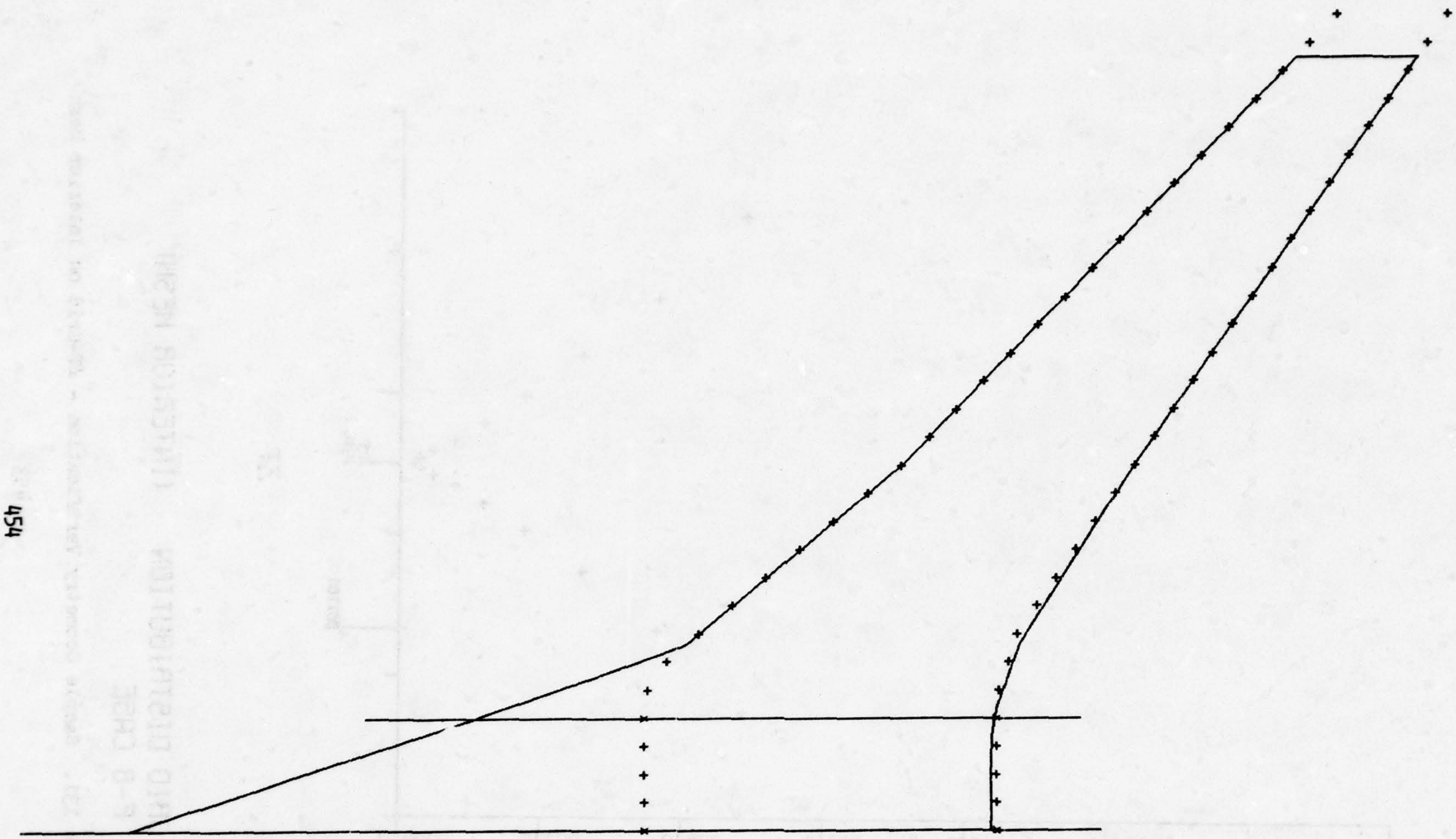


Figure 13i. Sample Geometry Verification - ZT-Grid on Interior Mesh



XI = 0. AND XI = 1.   (INTERIOR MESH)
F-8 CASE

FIGURE 13J. SAMPLE GEOMETRY VERIFICATION - XI=0 AND XI=1. LINES ON INTERIOR MESH

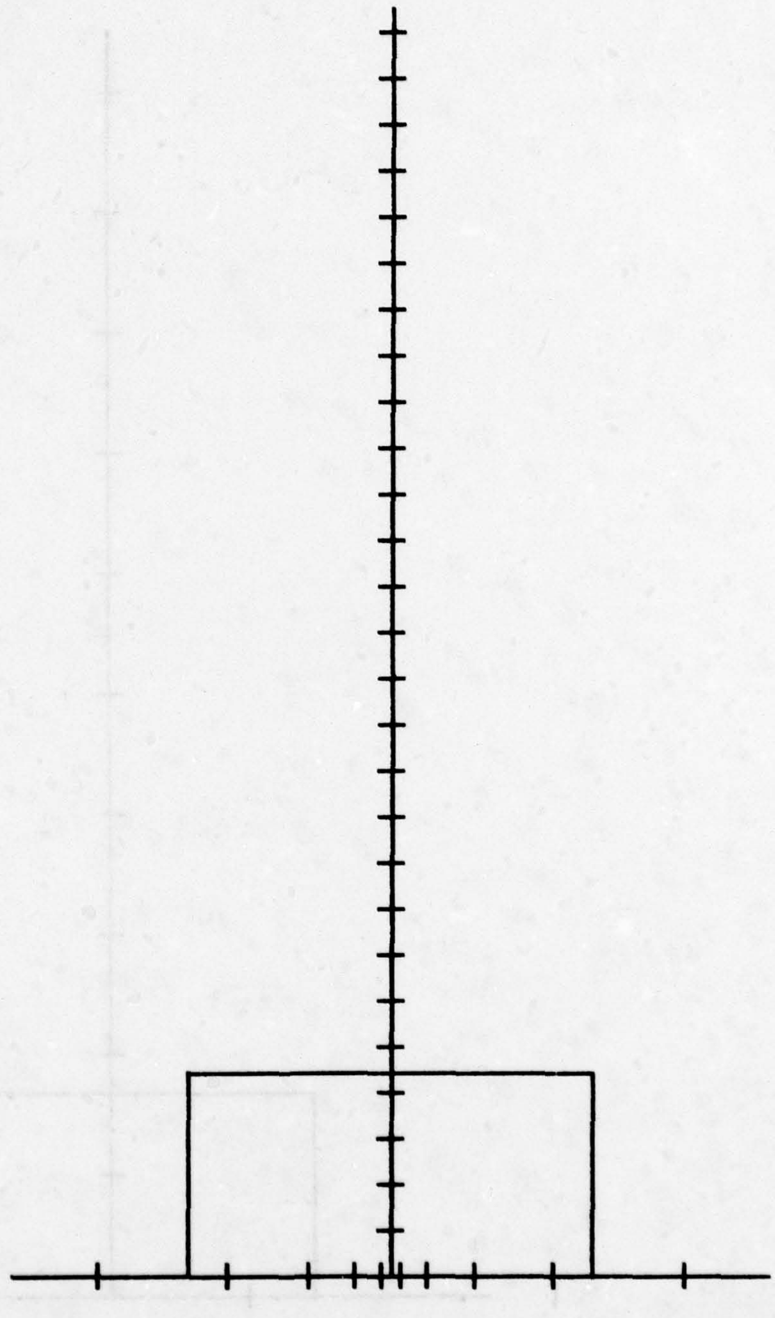
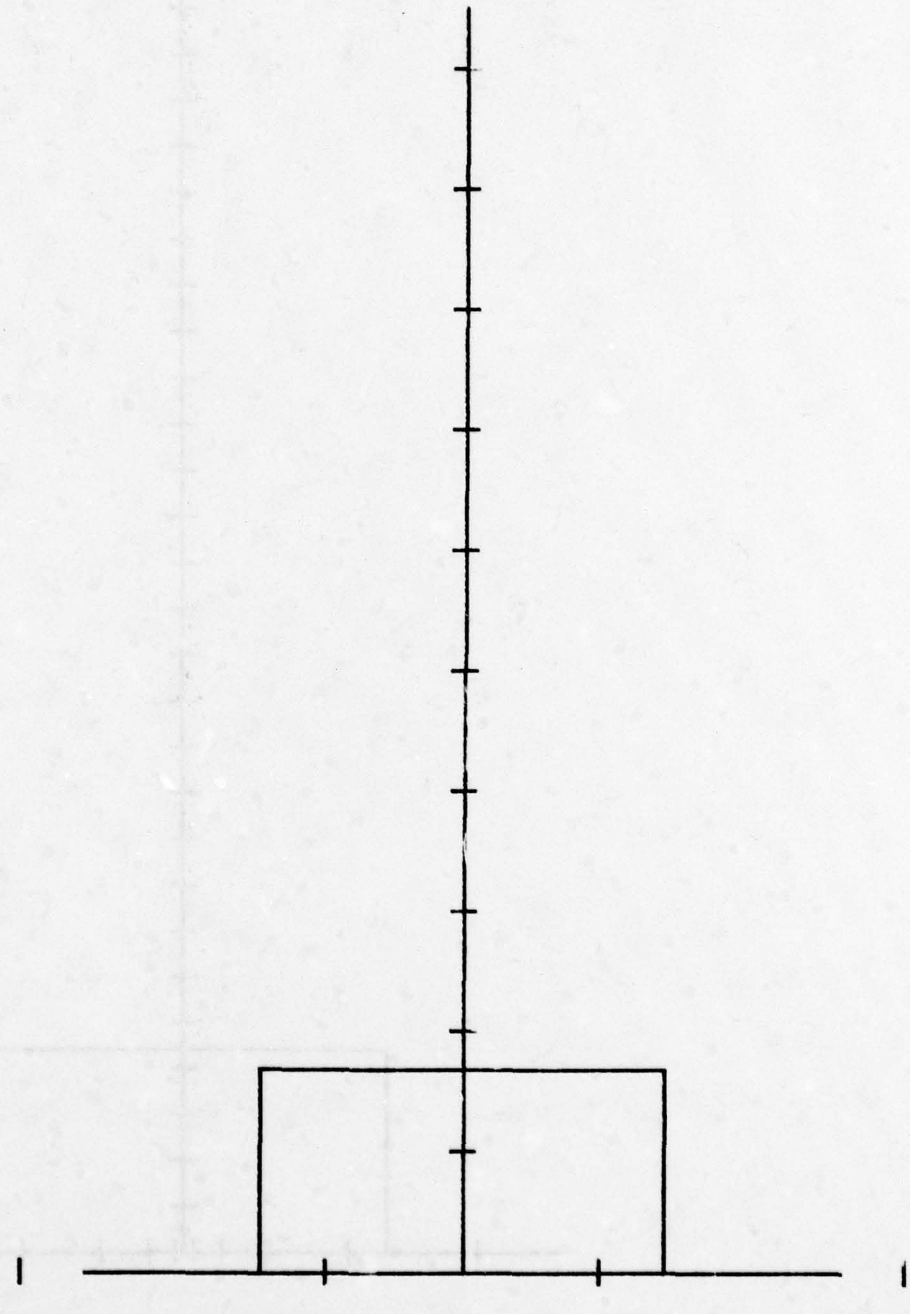
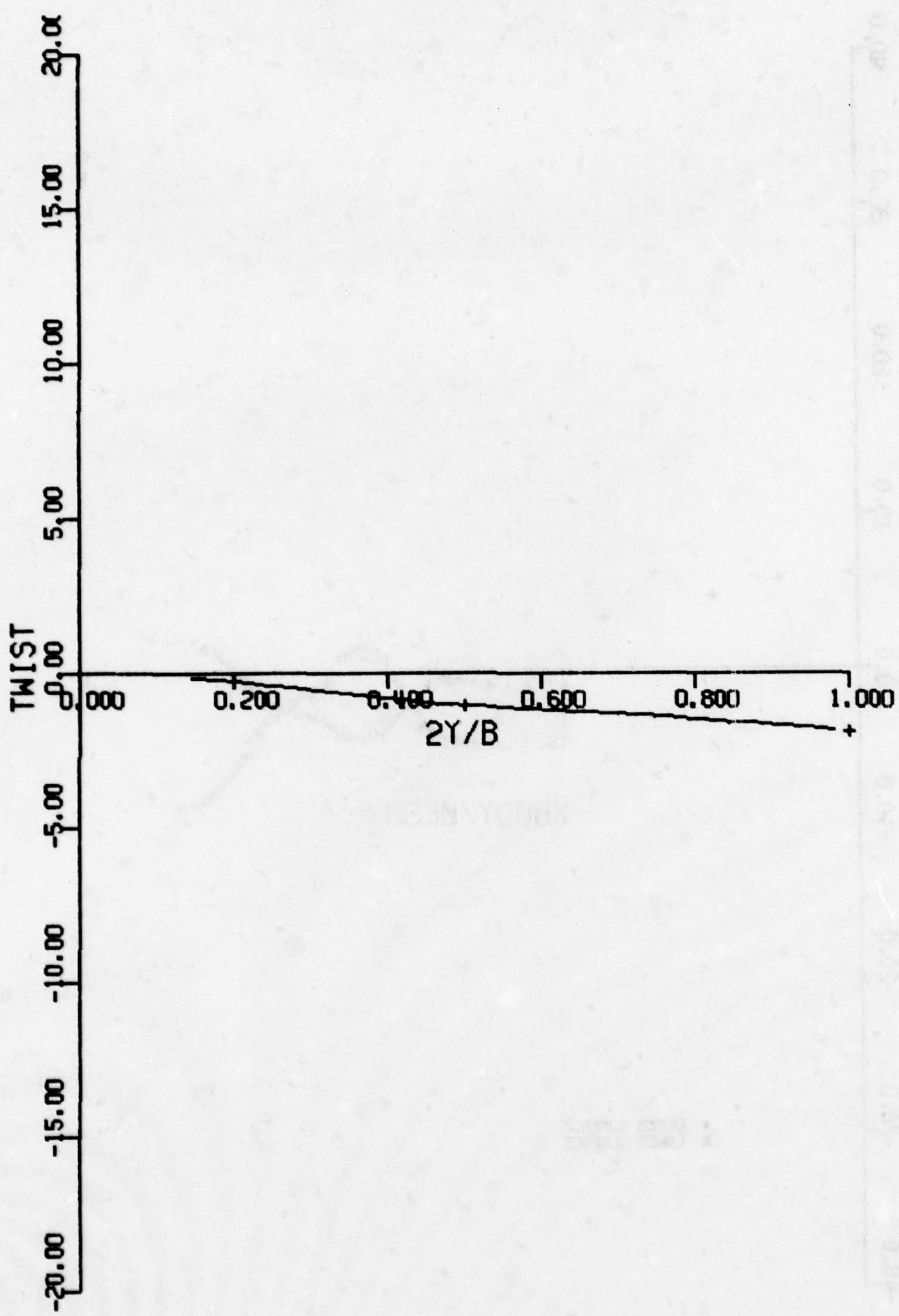


Figure 13k. Sample Geometry Verification - B.C. Support Surface on Interior Mesh



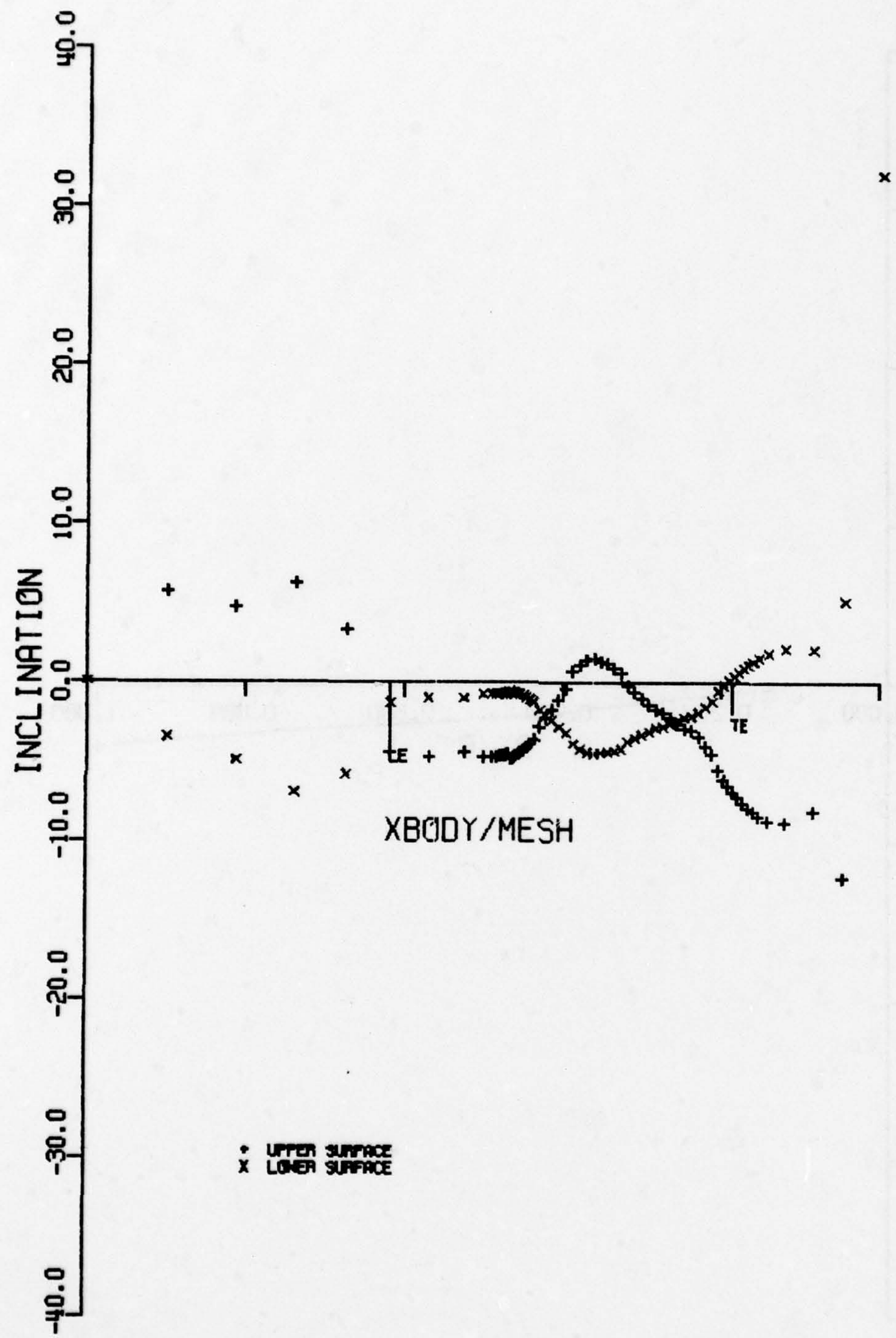
B.C. SUPPORT SURFACE (EXTERIOR MESH)
NACA TN D-712 BRICK BODY

Figure 131. Sample Geometry Verification - B.C. Support Surface on Exterior Mesh



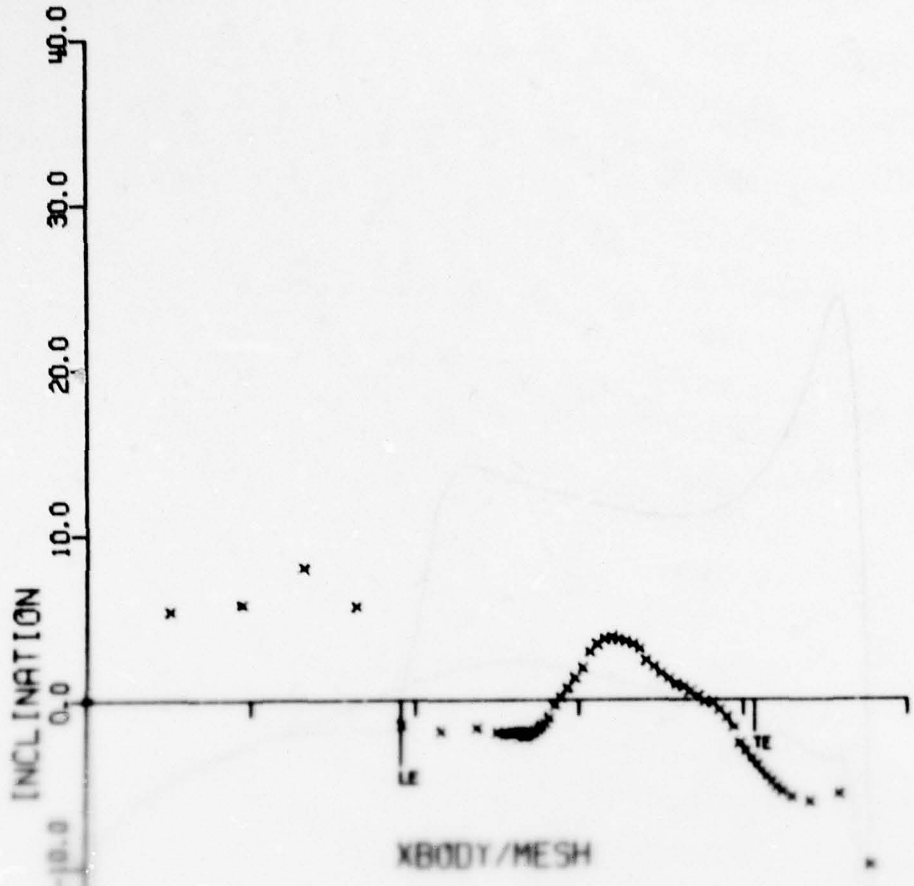
WING TWISTS (INTERIOR MESH)
TACT WITH AEROELASTIC TWIST

Figure 13m. Sample Geometry Verification - Wing Twists

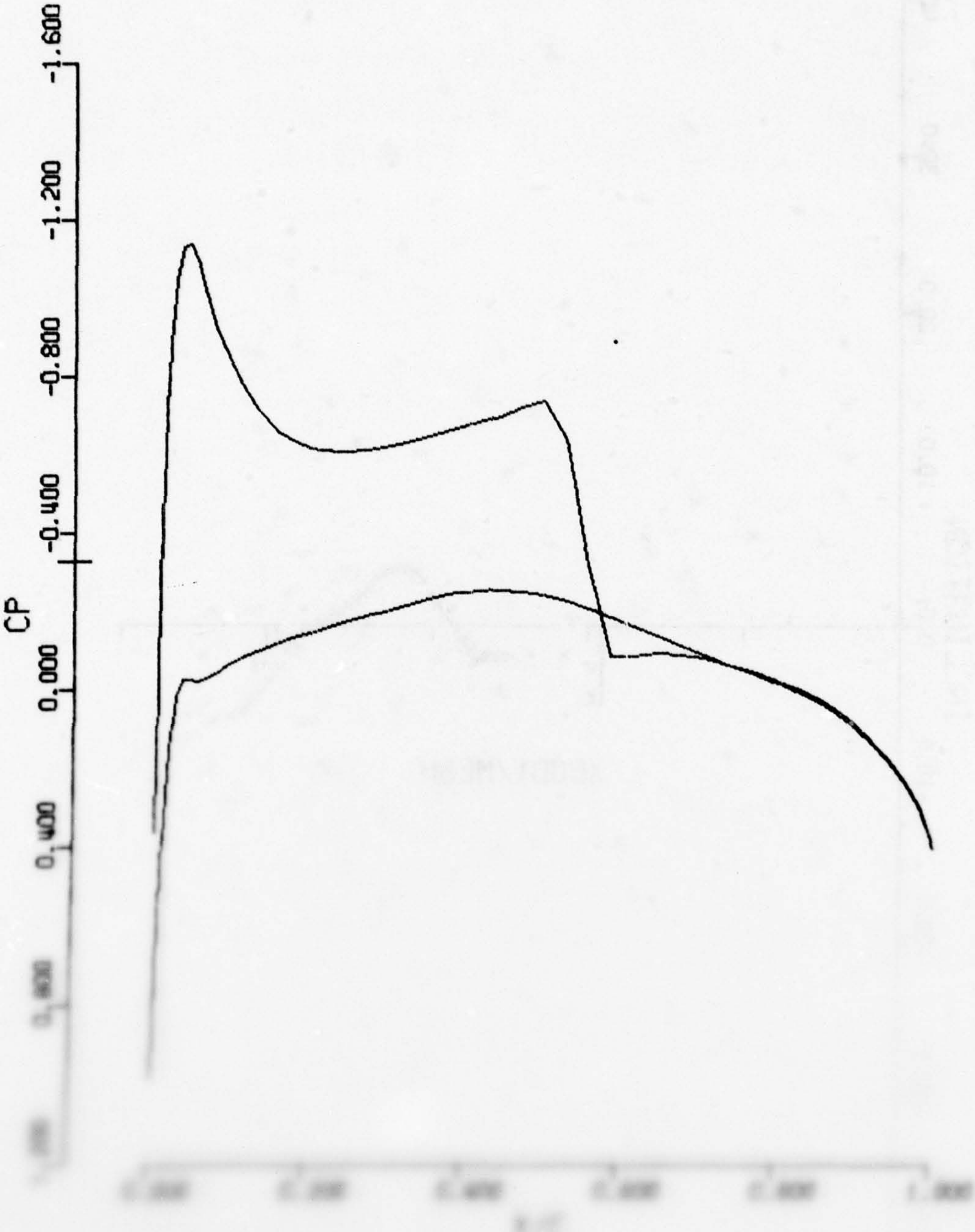


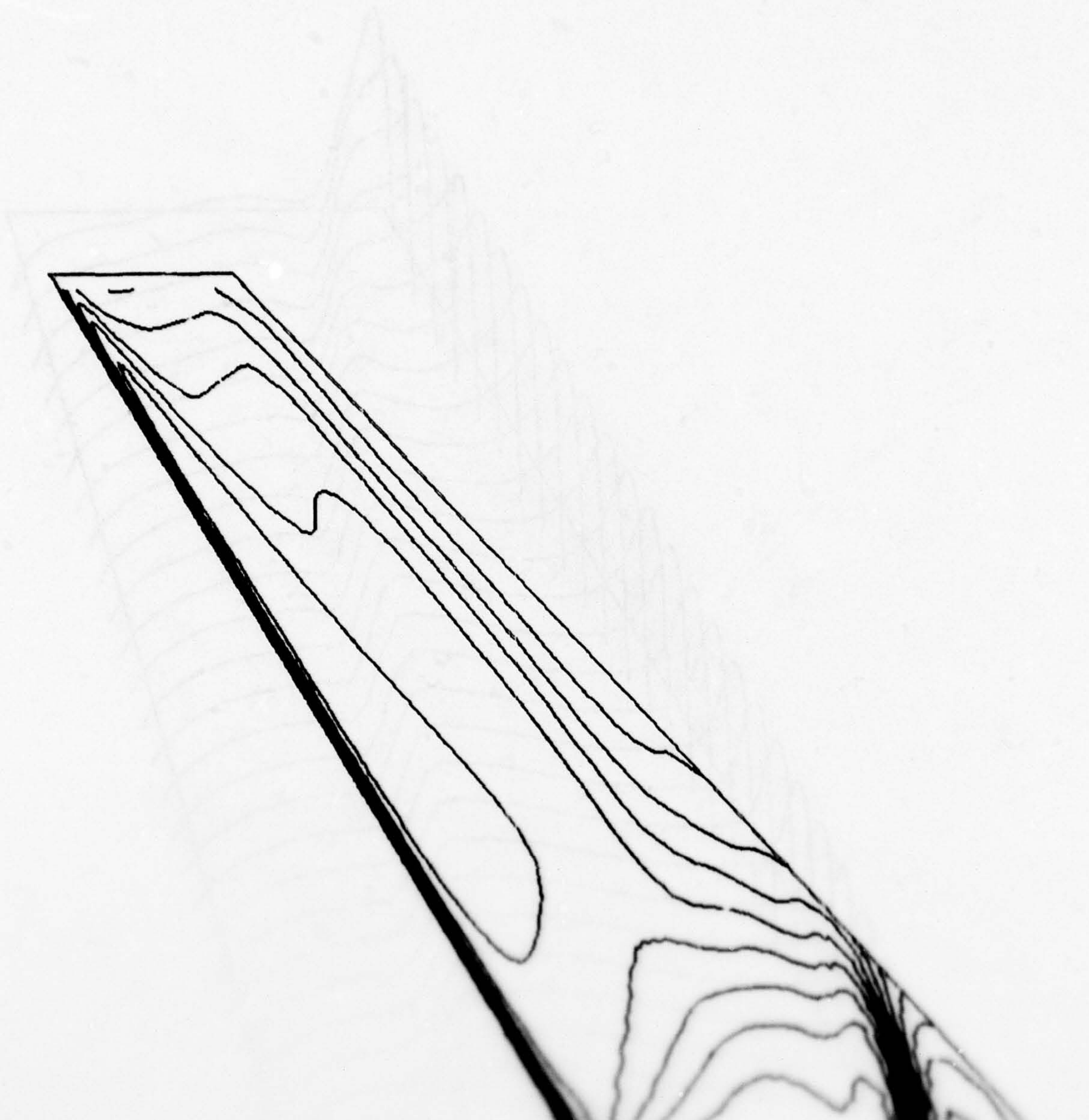
UPPER/LOWER BODY SLOPES AT K = 1 (INTERIOR MESH)
F-8 CASE

Figure 13n. Sample Geometry Verification - Upper and Lower Body Slopes on Interior Mesh

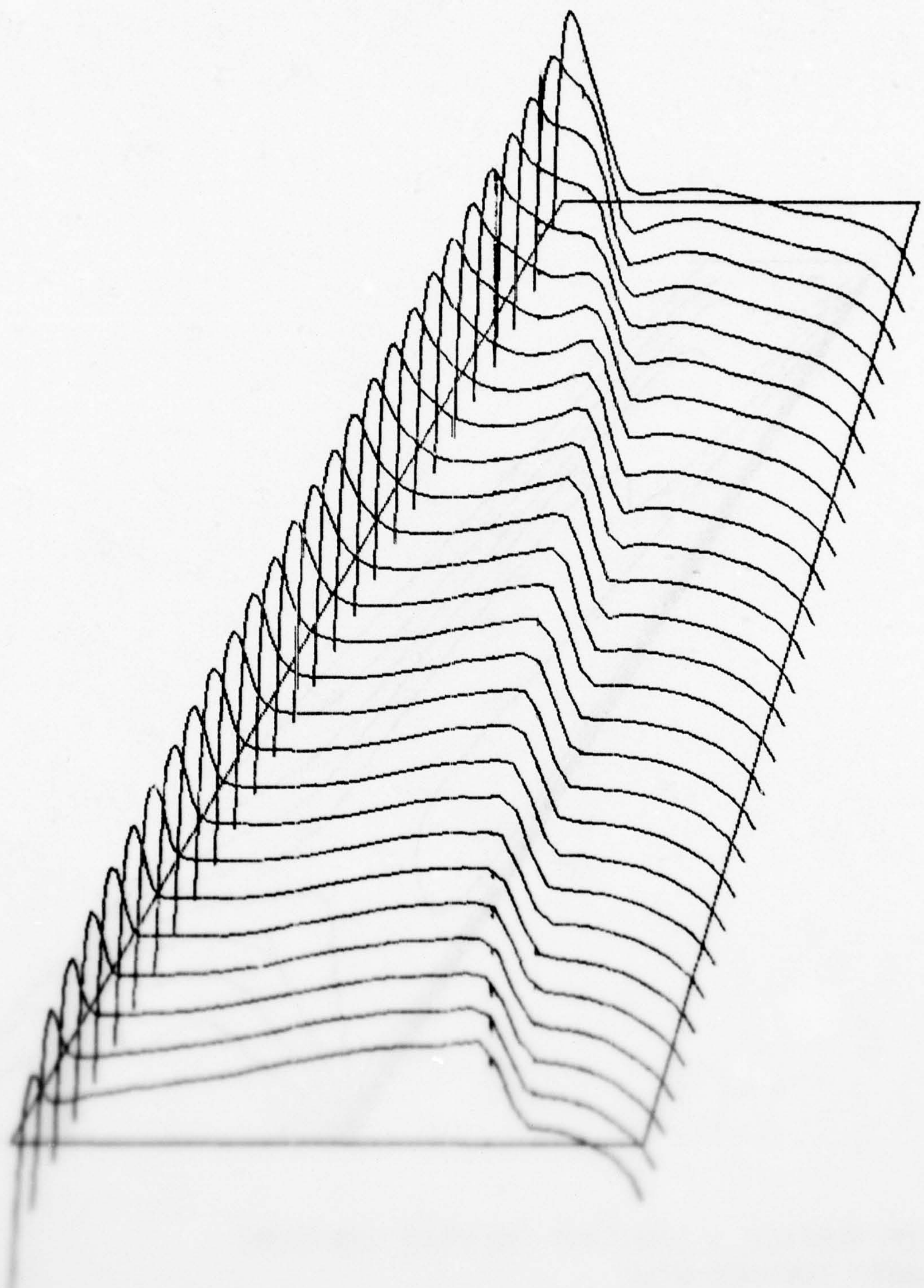


40.0
30.0
20.0
10.0
0.0
-10.0
INCLINATION
LE
TE
XBODY/MESH


CP
-1.600
-1.200
-0.800
-0.400
0.000
0.400



TOP SURFACE - CONSTANT PRESSURE CONTOURS



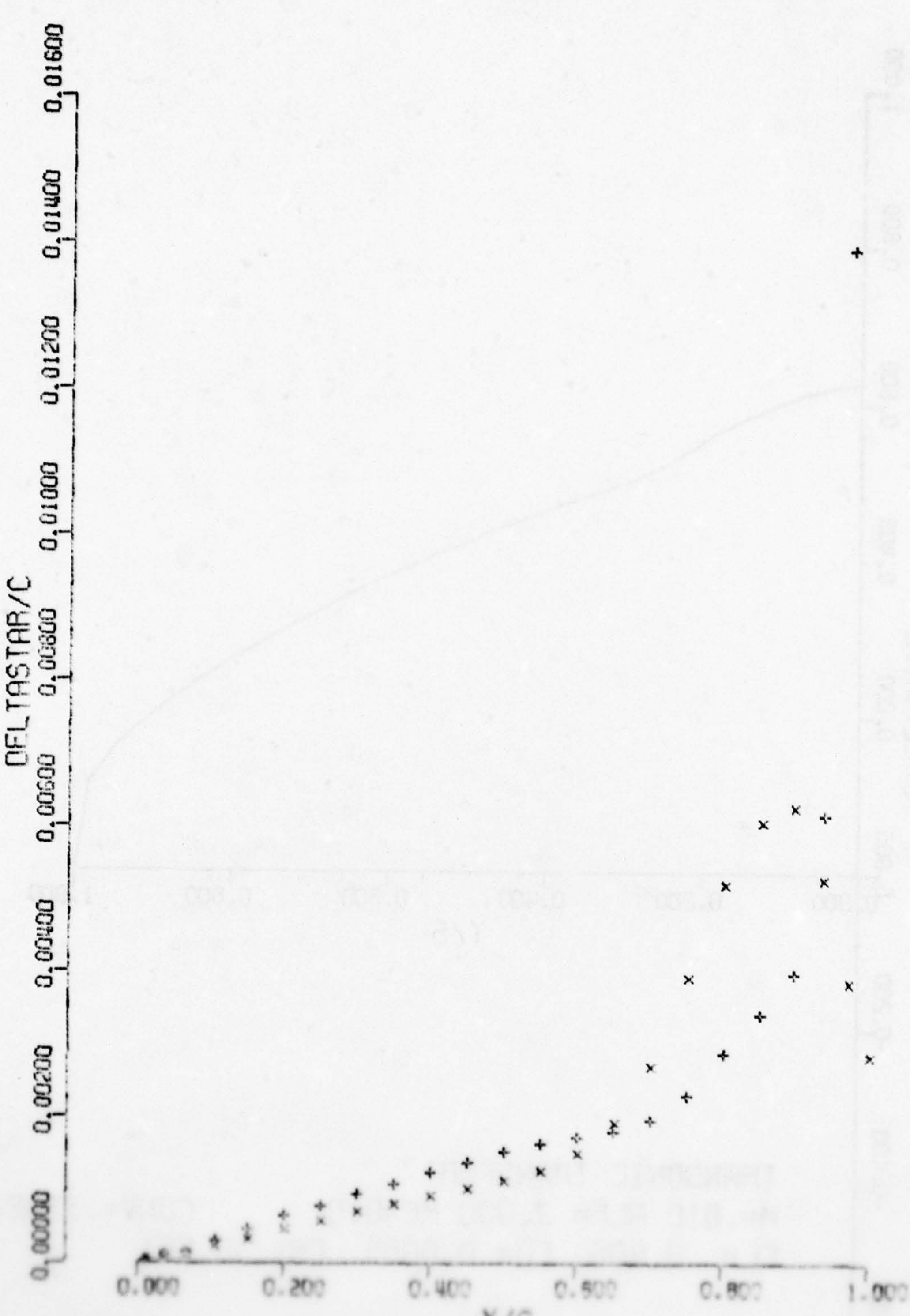


Figure 13e. Sample Final Solution Plots - Chordwise δ* Plot

TACT WING AND AIRFOILS - CASE A - NCP
M=0.850 ALF= 7.000 RE= 0.100E+08 CONV=.100E-03
SPAN STATION 10 1/S=0.980 22 MESH PTS ON CHD

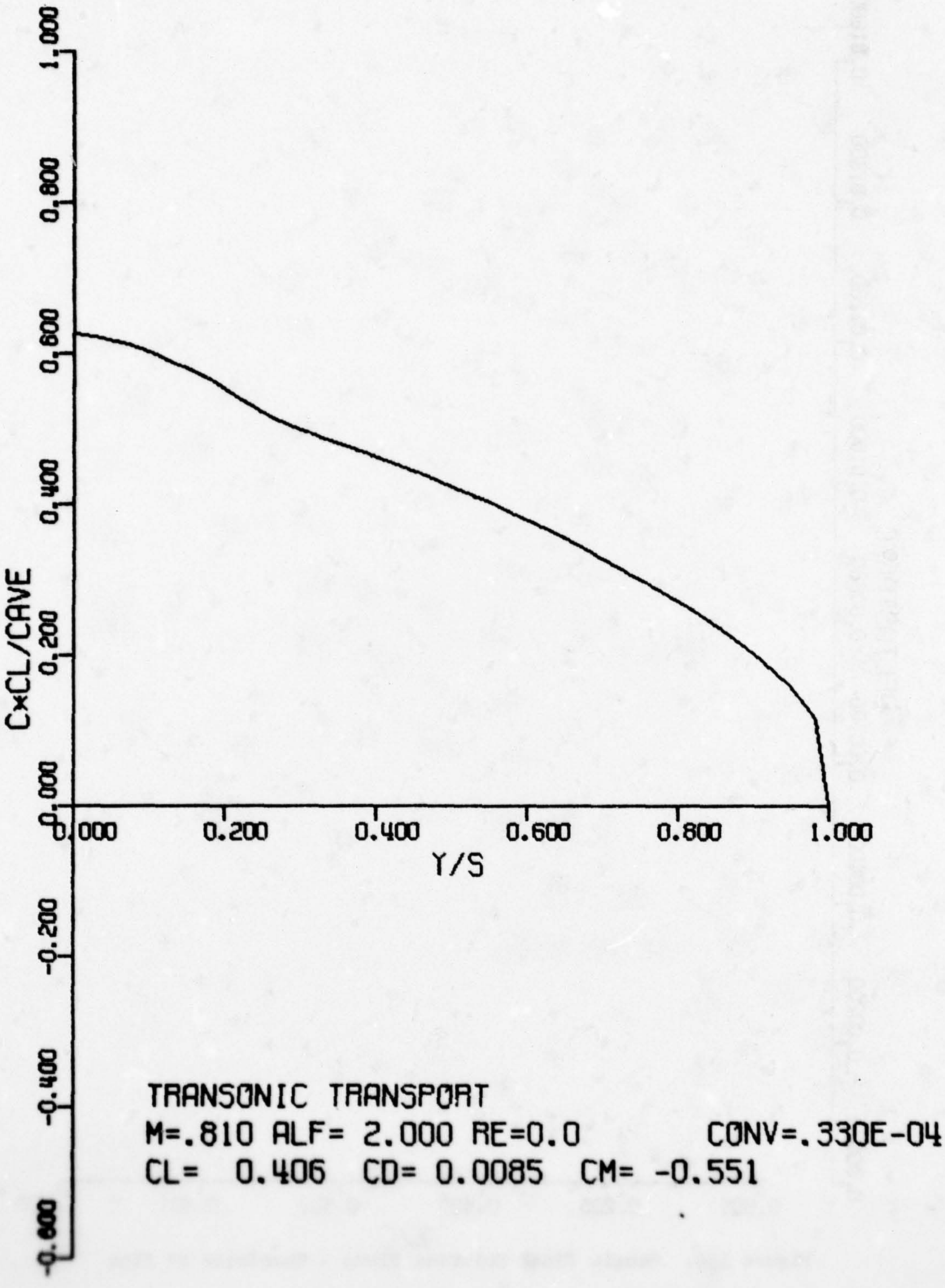


Figure 13t. Sample Final Solution Plots - Lift Span Load

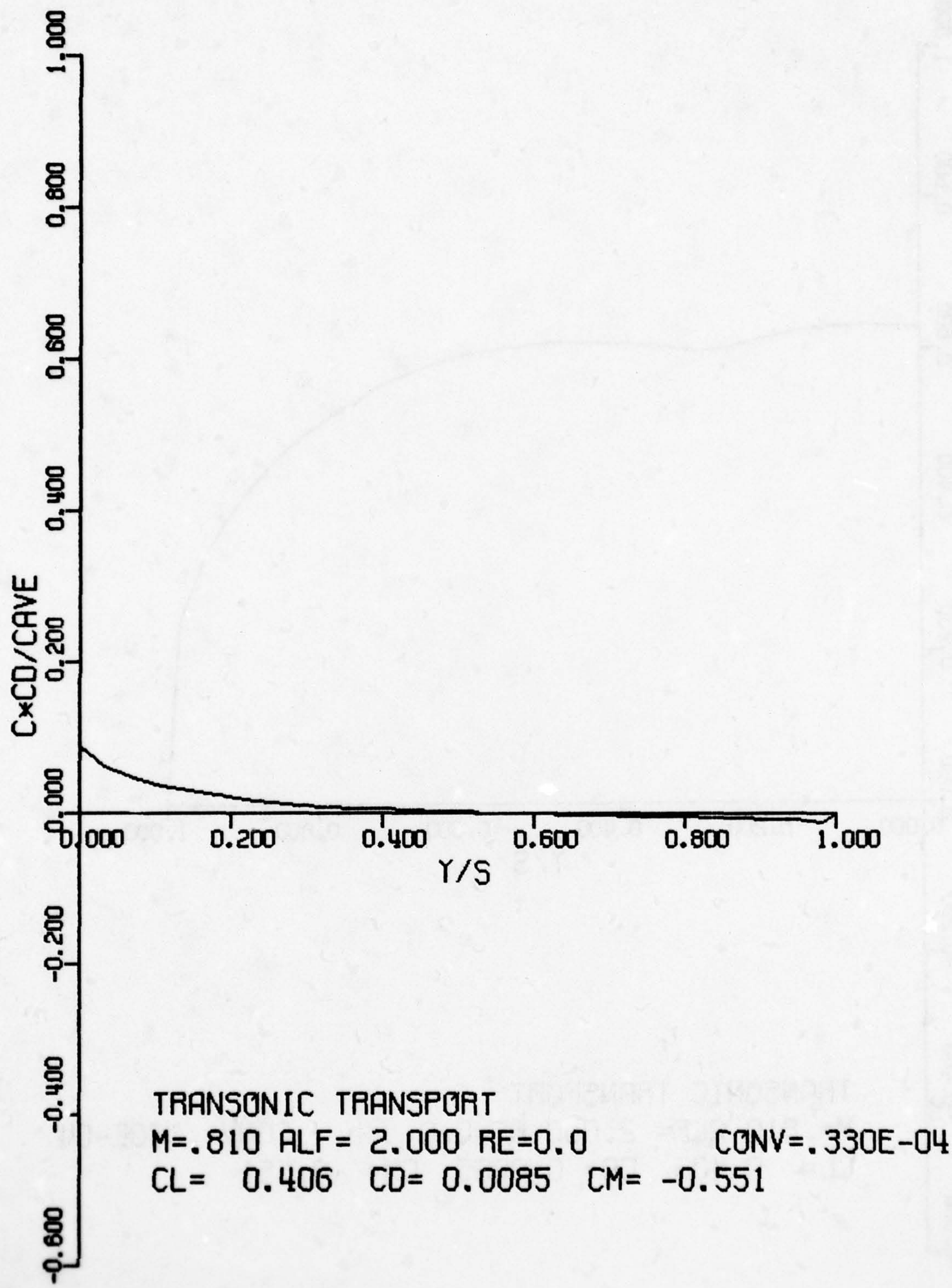


Figure 13u. Sample Final Solution Plots - Drag Span Load

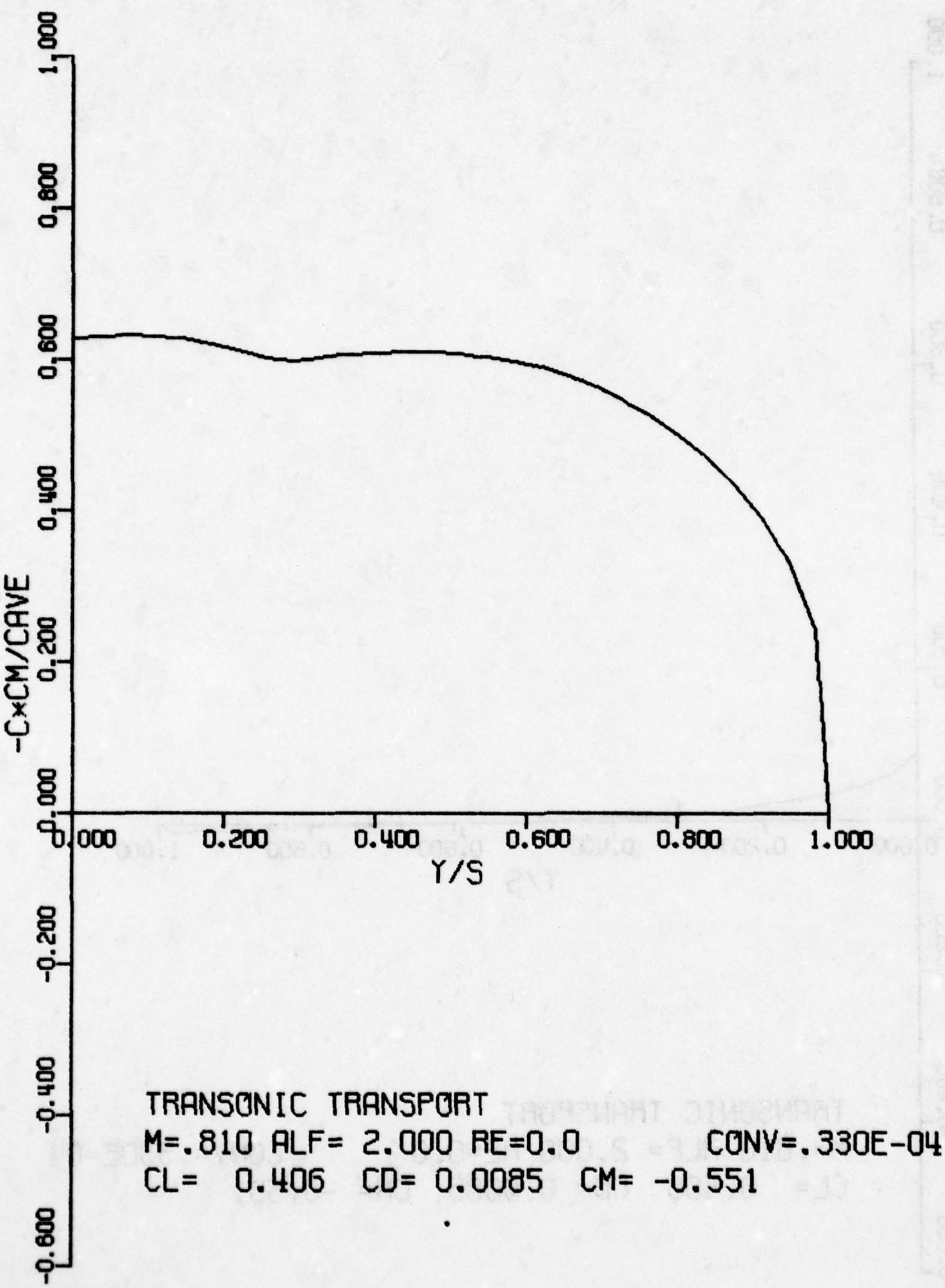


Figure 13v. Sample Final Solution Plots - Moment Span Load

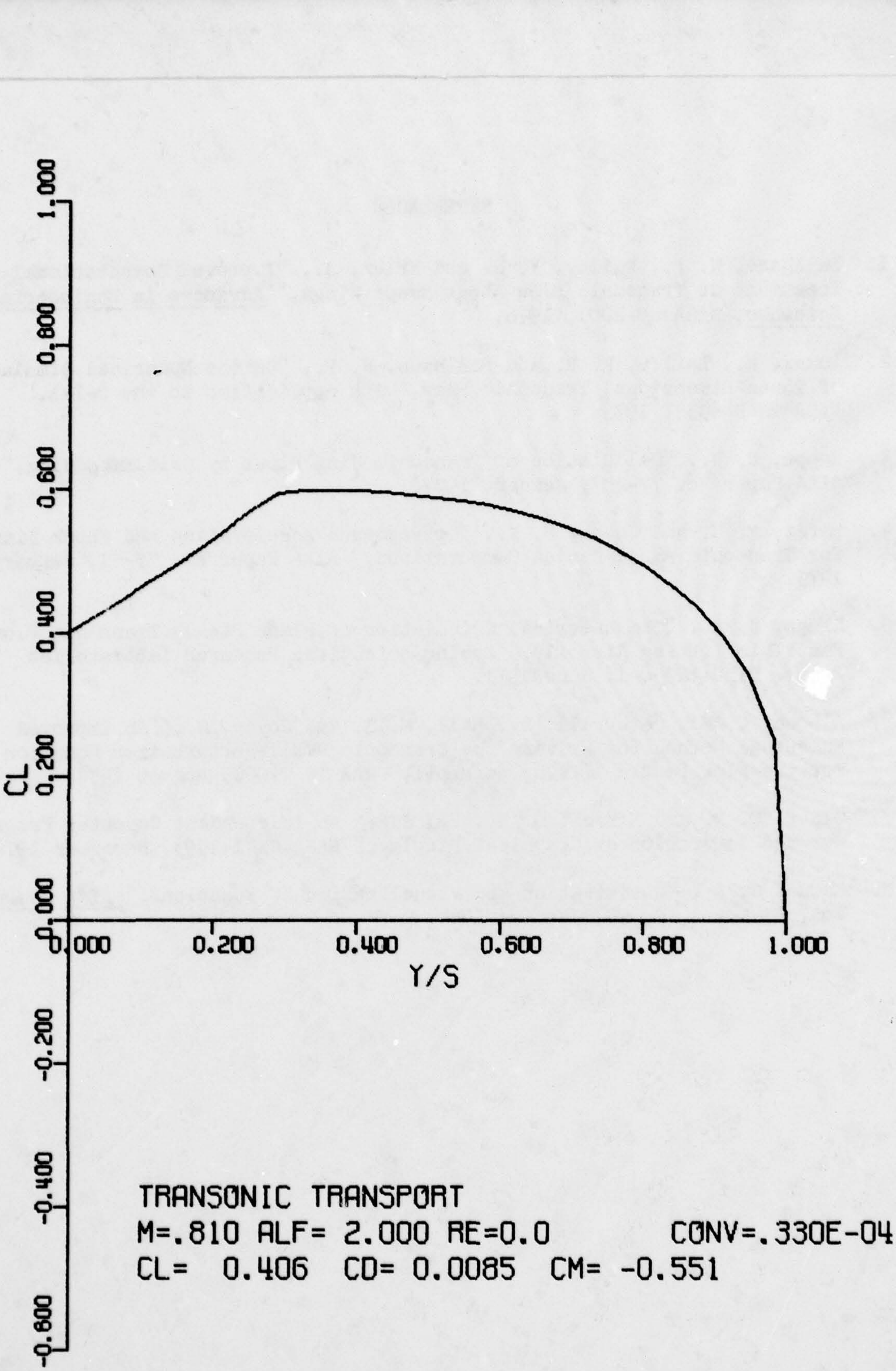


Figure 13w. Sample Final Solution Plots - Section Lift Coefficient

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